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ಪ್ರಧಾನ ಸಂಪಾದಕರು

ಪ್ರೊ. ಬಿ. ಪ್ರಶಾಂತ ನಾಯಕ

ಸಂಪಾದಕರು

ಪ್ರೊ. ಎಸ್. ಕೆ. ಸಾವಿತ್ರಿ

ಪ್ರೊ. ಬಿ. ಬಸವರಾಜಪ್ಪ

[illegible] ಸವಿತ

ಪ್ರಸಾರಾಂಗ

ಕುವೆಂಪು ವಿಶ್ವವಿದ್ಯಾಲಯ

ಪರಿವಿಡಿ

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ಮುಕ್ತ ಪ್ರಯೋಗ ಕನ್ನಡ-೨

(ರಾಷ್ಟ್ರೀಯ ಶಿಕ್ಷಣ ನೀತಿ – 2020)

[illegible] ಪದವಿ ಪೂರ್ವ ಶಿಕ್ಷಣ ಸಂಸ್ಥೆಗಳಲ್ಲಿ ಮುಕ್ತ ಪ್ರಯೋಗ

೨೦೨೧ – ೨೦೨೪

ಪ್ರಧಾನ ಸಂಪಾದಕರು

ಡಾ. ಜಿ. ಪ್ರಶಾಂತ ನಾಯಕ

ಸಂಪಾದಕರು : [illegible] | ಡಾ. [illegible]

ಕುವೆಂಪು ವಿಶ್ವವಿದ್ಯಾಲಯ

ಪದವಿ ಕಾಲೇಜು ಕನ್ನಡ ಅಧ್ಯಾಪಕರ ವೇದಿಕೆ

S.K.S

ಮುಕ್ತ ಆಯ್ಕೆ ಕನ್ನಡ–೨

ಪ್ರಥಮ ವರ್ಷದ ದ್ವಿತೀಯ ಸೆಮಿಸ್ಟರ್ ಮುಕ್ತ ಆಯ್ಕೆ ಪತ್ಯ
(೨೦೨೧–೨೪)
ಆತ್ಮಕಥನಗಳು

ಪ್ರಧಾನ ಸಂಪಾದಕರು
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ಸಂಪಾದಕರು
ಪ್ರೊ. ಎಸ್.ಕೆ. ಸಾವಿತ್ರಿ
ಪ್ರೊ. ಸಬಿತಾ ಬನ್ನಾಡಿ

ಕುವೆಂಪು ವಿಶ್ವವಿದ್ಯಾಲಯ
ಪದವಿ ಕಾಲೇಜು ಕನ್ನಡ ಅಧ್ಯಾಪಕರ ವೇದಿಕೆ

ಸುವ್ವಿ ಪಬ್ಲಿಕೇಶನ್ಸ್
ಡಾ.ಬಿ.ಆರ್.ಅಂಬೇಡ್ಕರ್ ರಸ್ತೆ, ಗಾಮ, ಶಿಕಾರಿಪುರ ತಾ. ಶಿವಮೊಗ್ಗ ಜಿ.
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Synthesis of Ferrite Nano Particle (FNPS)

Jagadisha A S[1], Shoukat Ali R A[2]*, Umesha S D[1], Narasimha S A[3], Nagaraj E[4], Kishore N Gujjar[5].

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Abstract

The ferromagnetic ceramics are extensively find applications in electronics and communication area in the last few decays includes nanoparticles. The method of preparation of ferrite nanoparticles are also plays a key role in the application filed. An overview of general classification and groups of ferrite systems are discussed. In continuing discussion the different method of preparation of ferrite system and their pros and cons followed by tool to characterise the synthesized ferrites such as XRD, SEM and EDAX.

Keywords: *Ceramics, FNP's, Sol-gel, Organic precursor, Co-precipitation, Ferrite Synthesis, SEM, XRD.*

1. Introduction

Ferrites have gained keen interest of researchers due to wide applications in different area of science and technology, such as wastewater treatment, catalyst and electronic device. Now a day's these ferrite nano particles are abbreviated FNPs. This caperer we are focusing on the synthesis, characterisation and a very brief over view of FNPs. The ferrite has wide application in different areas such as catalytic activities, water treatment biomedical applications and electronic device in the recent works. These ferrite materials are at nano dimension exhibit superior behaviour. The brief history of ferrite, general methods of preparation and their pros and corns are focused. The available characterization techniques are discussed.

2. Overview

The ferrite and its derivatives are classified under the unique section of ceramics composed of metal oxides and ferric oxide is its core element. These elements gains the

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6ನೇ ಕನ್ನಡ ವಿಜ್ಞಾನ ಸಮ್ಮೇಳನ

KANNADA VIJNANA SAMMELANA

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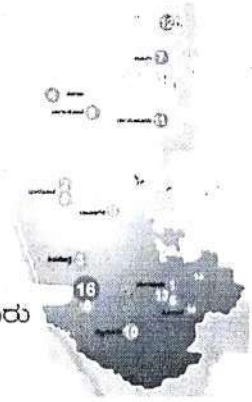

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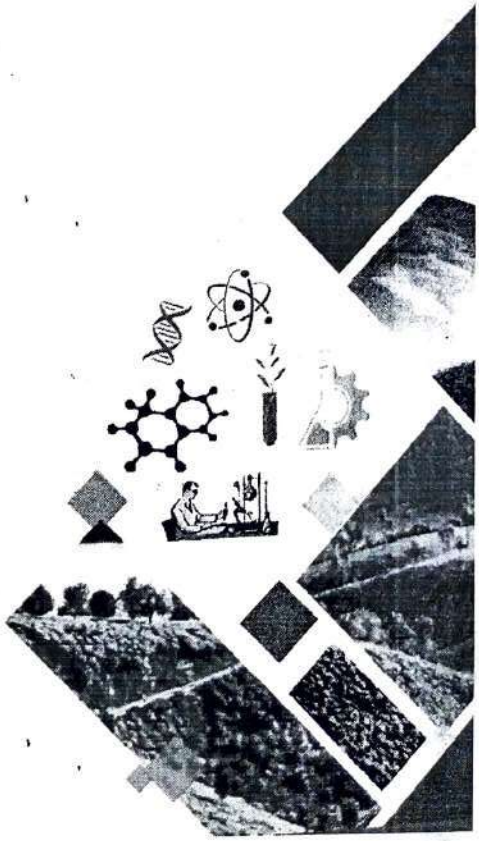

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MgO sample shown a best sensing performance of 99% and has shown a timing behavior of 14 s and 26 s. It also shows a good real sensitivity, limit of detection (LOD), linearity, hysteresis and shown good sensing stability over a period of two months. The humidity sensing mechanism has been discussed due to the formation of chemisorption and physisorption layers followed by capillary condensation process.

Keywords: Green synthesis; MgO; humidity sensing; Stability.

ಖಾನ್ಸರೀಯಂ - 6

ಪಾಲಥಿಲೀನ್ ಆಕ್ಸೈಡ್‌ನ ವಿದ್ಯುತ್ ಮತ್ತು ರಚನಾತ್ಮಕ ಗುಣಲಕ್ಷಣಗಳ ಮೇಲೆ ಅಮೋನಿಯಂ ಕ್ಲೋರೈಡ್ ಡೋಪಿಂಗ್‌ನ ಪರಿಣಾಮ

ಮಹಾಂತೇಶ ಜಿ ಕೆ1, 2, ರವೀಂದ್ರಾಚಾರಿ ವಿ1*, ಪದ್ಮಕುಮಾರಿ ಆರ್1, ಸಹನಕುಮಾರಿ ಆರ್ 1, ಪ್ರತೀಕ ತೆಗ್ಗಿನಮಠ1, ಮತ್ತು ರೋಹನ್ ಎನ್ ಸಾಗರ್1

1ಭೌತಶಾಸ್ತ್ರ ವಿಭಾಗ, ಮಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಮಂಗಳಗಂಗೋತ್ರಿ -574 199, 2ಭೌತಶಾಸ್ತ್ರ ವಿಭಾಗ, ಡಿವಿಎಸ್ ಕಲಾ ಮತ್ತು ವಿಜ್ಞಾನ ಕಾಲೇಜು, ಶಿವಮೊಗ್ಗ-577 201, *ಇಮೇಲ್: vravi2000@yahoo.com,

ಪಾಲಿಮರ್ ವಿದ್ಯುದ್ವಿಚ್ಛೇದ್ಯಗಳನ್ನು ಪಾಲಥಿಲೀನ್ ಆಕ್ಸೈಡ್ ಅನ್ನು ಹೋಸ್ಟ್ ಪಾಲಿಮರ್ ಮತ್ತು ಅಮೋನಿಯಂ ಕ್ಲೋರೈಡ್ ಅನ್ನು ಡೋಪಂಟ್ ಆಗಿ ಬಳಸಿ ದ್ರಾವಣ ಎರಕದ ವಿಧಾನದಿಂದ ತಯಾರಿಸಲಾಗುತ್ತದೆ. ಈ ಪಾಲಿಮರ್ ವಿದ್ಯುದ್ವಿಚ್ಛೇದ್ಯಗಳನ್ನು ವಿವಿಧ ಪ್ರಾಯೋಗಿಕ ತಂತ್ರಗಳನ್ನು ಬಳಸಿ ನಿರೂಪಿಸಲಾಗಿದೆ. ಅಮೋನಿಯಂ ಕ್ಲೋರೈಡ್ ಉಪ್ಪು ಪಾಲಥಿಲೀನ್ ಆಕ್ಸೈಡ್ ಮ್ಯಾಟ್ರಿಕ್ಸ್‌ನಲ್ಲಿ ಚೆನ್ನಾಗಿ ಸಂವಹನ ನಡೆಸುತ್ತದೆ; ಇದನ್ನು ಎಫ್‌ಟಿಐಆರ್ ಅಧ್ಯಯನಗಳಿಂದ ಗಮನಿಸಲಾಗಿದೆ. ವಿದ್ಯುತ್ ವಾಹಕತೆಯ ಅಧ್ಯಯನವನ್ನು ಎರಡು ತನಿಖಾ ವಿಧಾನದಿಂದ ನಡೆಸಲಾಯಿತು. ಈ ಅಧ್ಯಯನದಿಂದ, ವಿದ್ಯುತ್ ವಾಹಕತೆಯು ಹೆಚ್ಚುತ್ತಿರುವ ಉಪ್ಪಿನ ಸಾಂದ್ರತೆಯೊಂದಿಗೆ ಹೆಚ್ಚಾಯಿತು, ಗರಿಷ್ಠ ವಿದ್ಯುತ್ ವಾಹಕತೆ 3.5589 x 10-4 S/cm 5 wt.% ಉಪ್ಪು ಸಾಂದ್ರತೆಗಳಿಗೆ ಕೋಣೆಯ ಉಷ್ಣಾಂಶದಲ್ಲಿ. ಈ ವಾಹಕತೆಯ ಹೆಚ್ಚಳವು ಪಾಲಿಮರ್ ವಿದ್ಯುದ್ವಿಚ್ಛೇದ್ಯದ ಅಸ್ಫಾಟಿಕ ಸ್ವಭಾವದ ಹೆಚ್ಚಳದೊಂದಿಗೆ ಚೆನ್ನಾಗಿ ಸಂಬಂಧ ಹೊಂದಿದೆ; ಇದನ್ನು ಫಿಖಆ ಅಧ್ಯಯನಗಳಿಂದ ದೃಢಪಡಿಸಲಾಗಿದೆ. ಕೋಲ್-ಕೋಲ್ ಪ್ಲಾಟ್ 4.0558 x 10-4 S/cm ನಿಂದ ಗರಿಷ್ಠ ವಿದ್ಯುತ್ ವಾಹಕತೆ, ಇದು DC ವಾಹಕತೆಯ ಅಧ್ಯಯನಗಳೊಂದಿಗೆ ಉತ್ತಮ ಒಪ್ಪಂದವಾಗಿದೆ; ಉಪ್ಪಿನ ಸಾಂದ್ರತೆಯ ಹೆಚ್ಚಳದೊಂದಿಗೆ ಕೆಪ್ಯಾಸಿಟಿವ್ ರಿಯಾಕ್ಟನ್ಸ್ ಕಡಿಮೆಯಾಗುತ್ತದೆ ಎಂದು ಸಹ ಗಮನಿಸಲಾಗಿದೆ. ಇದರರ್ಥ ಕಡಿಮೆ ಆವರ್ತನ ಅರೆ ವೃತ್ತವು ಕಡಿಮೆಯಾಗುತ್ತದೆ ಮತ್ತು ಉಪ್ಪಿನ ಸಾಂದ್ರತೆಯೊಂದಿಗೆ ಅಧಿಕ ಆವರ್ತನ ಸ್ಪೈಕ್ ಹೆಚ್ಚಾಗುತ್ತದೆ. ತಯಾರಾದ ಪಾಲಿಮರ್ ವಿದ್ಯುದ್ವಿಚ್ಛೇದ್ಯಗಳ ಡೈಎಲೆಕ್ಟ್ರಿಕ್ ಸ್ಪೆಕ್ಟ್ರಾವನ್ನು ಅಧ್ಯಯನ ಮಾಡಲಾಗುತ್ತದೆ; ಇದು ಡೈಎಲೆಕ್ಟ್ರಿಕ್ ಸ್ಥಿರ ಮತ್ತು ಡೈಎಲೆಕ್ಟ್ರಿಕ್ ನಷ್ಟ ಎರಡೂ ಆವರ್ತನ ಹೆಚ್ಚಳದೊಂದಿಗೆ ಕಡಿಮೆಯಾಗಿದೆ ಎಂದು ತೋರಿಸುತ್ತದೆ. ತಯಾರಾದ ಪಾಲಿಮರ್ ವಿದ್ಯುದ್ವಿಚ್ಛೇದ್ಯದ AC ವಾಹಕತೆಯನ್ನು ಪ್ರತಿರೋಧ ವಿಶ್ಲೇಷಣೆಯನ್ನು ಬಳಸಿ ಅಧ್ಯಯನ ಮಾಡಲಾಗಿದೆ. ಗರಿಷ್ಠ ಅಯಾನಿಕ್ ವಾಹಕತೆಯು 7.7579x10-4 S/cm 5 MHz ಆವರ್ತನದಲ್ಲಿ ಉಪ್ಪು ಸಾಂದ್ರತೆಯ 5 wt% ನಲ್ಲಿ ಕಂಡುಬಂದಿದೆ.

ಕೀವರ್ಡ್‌ಗಳು: ಪಿವಿಎ, ಅಮೋನಿಯಂ ಕ್ಲೋರೈಡ್, UV-Visible, FE-SEM, ಸಿಐಸಿ ಮತ್ತು ಸಂಕೀರ್ಣತೆ.

EFFECT OF NH4CL DOPING ON ELECTRICAL AND STRUCTURAL PROPERTIES OF POLYETHYLENE OXIDE

Mahantesha B K1, 2, Ravindrachary V1*, Padmakumari R1, Sahanakumari R1, Pratheeka Tegginamata1, and Rohan N Sagar1

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The polymer electrolytes are prepared by solution casting method using PEO as host polymer and NH4Cl as dopant. These polymer electrolytes were characterised by using various experimental techniques. NH4Cl salt is well interacted in the PEO matrix; this has been observed from FTIR studies. The electrical conductivity studies were carried out by two probe method. From this study, the electrical conductivity was increases with increasing salt concentration, the maximum electrical conductivity 3.5589x10-4 S/cm for 5 wt% salt concentrations at room temperature. This increase in conductivity is well correlated with increase in the amorphous nature of the polymer electrolyte; this is confirmed from XRD studies. The maximum electrical conductivity from Cole-Cole plot 4.0558x10-4 S/cm, this is good agreement with the DC conductivity studies; it is also observed that the capacitive

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reactance decreases with increase in salt concentration. This means that the low frequency semi-circle decreases and high frequency spike increases with salt concentration. The dielectric spectra of prepared polymer electrolytes are studied, it shows that the both dielectric constant and dielectric loss was decreases with increase in frequency. The AC conductivity of prepared polymer electrolyte was studied using impedance analysis. The maximum ionic conductivity was found to be 7.7579x10-4 S/cm at 5 wt% of salt concentration at 5 MHz frequency

Keywords: PVA, NH4Cl, FE-SEM, CTC, and Complexation

ಸಾರಾಂಶ - 7

ಎಲ್-ಅರ್ಜಿನೈನ್/ಪಿವಿಎ ಪಾಲಿಮರ್ ಸಂಯೋಜನೆಯ ಮೈಕ್ರೋಸ್ಟ್ರಕ್ಚರಲ್ ಮತ್ತು ಆಪ್ಟಿಕಲ್ ಗುಣಲಕ್ಷಣಗಳು

ಮಹಾಂತೇಶ ಬಿ ಕೆ1, 2, ರವೀಂದ್ರಾಚಾರಿ ವಿ1*, ಪದ್ಮಕುಮಾರಿ ಆರ್1, ಸಹನಕುಮಾರಿ ಆರ್1, ಪ್ರತೀಕ ತಗ್ಗಿನಮಠ1, ಮತ್ತು ರೋಹನ್ ಎನ್ ಸಾಗರ್1

1ಭೌತಶಾಸ್ತ್ರ ವಿಭಾಗ, ಮಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಮಂಗಳಗಂಗೋತ್ರಿ -574 199. 2ಭೌತಶಾಸ್ತ್ರ ವಿಭಾಗ, ಡಿವಿಎಸ್ ಕಲಾ ಮತ್ತು ವಿಜ್ಞಾನ ಕಾಲೇಜು, ಶಿವಮೊಗ್ಗ-577 201, *ಇಮೇಲ್: vravi2000@yahoo com

ಎಲ್-ಅರ್ಜಿನೈನ್ ಡೋಪ್ಡ್ ಪಾಲಿವಿನೈಲ್ ಆಲ್ಕೋಹಾಲ್‌ನ ಮೈಕ್ರೊಸ್ಟ್ರಕ್ಚರಲ್ ಮತ್ತು ಆಪ್ಟಿಕಲ್ ಗುಣಲಕ್ಷಣಗಳನ್ನು ದ್ರಾವಕ ಎರಕದ ತಂತ್ರವನ್ನು ಬಳಸಿ ಪಿವಿಎ ಮತ್ತು ಎಲ್-ಅರ್ಜಿನೈನ್‌ನ ವಿಭಿನ್ನ ತೂಕದ ಅನುಪಾತಗಳನ್ನು ಬಳಸಿ ಡಬಲ್ ಡಿಸ್ಟಿಲ್ಡ್ ವಾಟರ್ ಅನ್ನು ದ್ರಾವಕವಾಗಿ ಬಳಸಲಾಗಿದೆ. ತಯಾರಾದ ಪಾಲಿಮರ್ ಸಂಯೋಜನೆಗಳನ್ನು FTIR, UV-Vis, XRD, ಮತ್ತು SEM ಬಳಸಿ ನಿರೂಪಿಸಲಾಗಿದೆ. ಎಫ್‌ಟಿಐಆರ್ ಸ್ಪೆಕ್ಟ್ರಾ ಪಿವಿಎ-ಪ್ರೋಟಾನ್‌ನ ಪರಸ್ಪರ ಕ್ರಿಯೆಯು ಇಂಟ್ರಾ/ಇಂಟರ್ ಅಣ್ವೀಯ ಹೈಡ್ರೋಜನ್ ಬಂಧ ಮತ್ತು ಫಾರ್ಮ್ ಚಾರ್ಜ್ ಟ್ರಾನ್ಸ್‌ಫರ್ ಕಾಂಪ್ಲೆಕ್ಸ್ (ಸಿಟಿಸಿ) ಮೂಲಕ ಬಹಿರಂಗಪಡಿಸುತ್ತದೆ. ಈ ಸಂಯೋಜಿತ CTC ಯು ಆಪ್ಟಿಕಲ್ ಗುಣಲಕ್ಷಣಗಳ ಮೇಲೆ ಪರಿಣಾಮ ಬೀರುತ್ತದೆ. ಇದು UV-Vis ಅಧ್ಯಯನದಿಂದ ಪ್ರತಿಫಲಿಸುತ್ತದೆ. ಈ ಅಧ್ಯಯನದಿಂದ ಆಪ್ಟಿಕಲ್ ಎನರ್ಜಿ ಬ್ಯಾಂಡ್ ಅಂತರ ಕಡಿಮೆಯಾಗುತ್ತದೆ ಮತ್ತು ಸಕ್ರಿಯಗೊಳಿಸುವ ಶಕ್ತಿಯು ಡೋಪಂಟ್ ಸಾಂದ್ರತೆಯ ಹೆಚ್ಚಳದೊಂದಿಗೆ ಹೆಚ್ಚಾಗುತ್ತದೆ. ಪಾಲಿಮರ್ ಮ್ಯಾಟ್ರಿಕ್ಸ್‌ನಲ್ಲಿ ಡೋಪಂಟ್‌ನ ಸಂಕೀರ್ಣತೆಯನ್ನು ಅಧ್ಯಯನ ಮಾಡಲು ಫಿಟಿಐ ಅನ್ನು ಬಳಸಲಾಗಿದೆ ಮತ್ತು ಡೋಪಂಟ್ ಸಾಂದ್ರತೆಯೊಂದಿಗೆ ಅಮೊರ್ಫಿಸಿಟಿಯ ಹೆಚ್ಚಳವು ಕಂಡುಬಂದಿದೆ (12 Wt% ವರೆಗೆ). ಆದಾಗ್ಯೂ, ಎಲ್-ಅರ್ಜಿನೈನ್ ಕಣಗಳ ಸ್ಫಟಿಕದ ಗಾತ್ರವು 15 wt.% ಗೆ ಗಮನಾರ್ಹವಾಗಿ ಹೆಚ್ಚಾಗಿದೆ ಎಲ್-ಅರ್ಜಿನೈನ್/ಪಿವಿಎ ಸಂಯೋಜಿತ ಚಿತ್ರಗಳು 15 wt.% ಎಲ್-ಅರ್ಜಿನೈನ್ ಸಾಂದ್ರತೆಯಲ್ಲಿ ಸಿ= ಸಿ ಗುಂಪಿನ ಪುನಃ ಕಾಣಿಸಿಕೊಳ್ಳುವಿಕೆಯಿಂದಾಗಿ, ಈ ಹಿಂದಿನ ಅಧ್ಯಯನಗಳಿಂದ ದೃಢೀಕರಿಸಲ್ಪಟ್ಟಿದೆ. FE-SEM ಅಧ್ಯಯನಗಳಿಂದಲೂ ಪ್ರತಿಫಲಿಸುತ್ತದೆ. ಸಂಯೋಜಿತ ಚಿತ್ರಗಳ ಮೇಲ್ಮೈ ಮೃದುತ್ವವು ಡೋಪಂಟ್ ಸಾಂದ್ರತೆಯೊಂದಿಗೆ 12 wt.% ವರೆಗೆ ಹೆಚ್ಚಾಗುತ್ತದೆ ಎಲ್-ಅರ್ಜಿನೈನ್ ಸಾಂದ್ರತೆಯು 12 wt % ಹೆಚ್ಚು ವಿಶಿಷ್ಟ ಮತ್ತು ಏಕರೂಪದ ರಚನೆ. ಆದಾಗ್ಯೂ 15 wt.% ನಷ್ಟು ಡೋಪಂಟ್ ಸಾಂದ್ರತೆಯು PVA ಪಾಲಿಮರ್ ಮ್ಯಾಟ್ರಿಕ್ಸ್‌ನಿಂದ ಹಂತವನ್ನು ಒಟ್ಟುಗೂಡಿಸುತ್ತದೆ ಮತ್ತು ಇನ್ಸುಲೇಟಿಂಗ್ ಕ್ಲಸ್ಟರ್‌ಗಳನ್ನು ರೂಪಿಸುತ್ತದೆ. ಈ ಹಂತವು ಬೇರ್ಪಡಿಸಿದ ನಿರೋಧಕ ಪರ್ಕೊಲೇಷನ್ ಕ್ಲಸ್ಟರ್‌ಗಳನ್ನು ಅಡ್ಡಿಪಡಿಸುವ ಅಯಾನ್ ಚಲನೆಯನ್ನು ಪ್ರತ್ಯೇಕಿಸುತ್ತದೆ. ಈ ವಿದ್ಯಮಾನವು XRD ಫಲಿತಾಂಶಗಳಿಂದ ಬಲವಾಗಿ ಬೆಂಬಲಿತವಾಗಿದೆ

ಕೀವರ್ಡ್‌ಗಳು: ಪಿವಿಎ, ಎಲ್-ಅರ್ಜಿನೈನ್, UV-Visible, FE-SEM, ಸಿಟಿಸಿ ಮತ್ತು ಸಂಕೀರ್ಣತೆ

MICROSTRUCTURAL AND OPTICAL PROPERTIES OF L-ARGININE/ PVA POLYMER COMPOSITE

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Microstructural and optical properties of L-Arginine doped polyvinyl alcohol has been prepared by using solvent casting technique with different weight ratios of PVA and L-Arginine using double distilled water as solvent. The prepared polymer composites are characterized by using FTIR, UV-Vis, XRD, and SEM. The FTIR spectra reveals that the interactions of PVA-Proton via intra/inter molecular hydrogen bonding and forms charge transfer complex (CTC). These formed CTC within the composite will affect the optical properties, which is reflected from the UV-Vis study. From this study the optical energy band gap decreases and activation energy increases with increase in the

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ಭಾಸ್ಕರೀಯಂ-1

ನೈಲಾನ್-6 ಪಾಲಿಮರ್ ನ ಸ್ಟ್ರಕ್ಚರಲ್, ಮಾರ್ಫೋಲೊಜಿಕಲ್ ಮತ್ತು ಎಲೆಕ್ಟ್ರಿಕಲ್ ಪ್ರಾಪರ್ಟೀಸ್ ಮೇಲೆ ಕೆಟ್ಜೆನ್ ಬ್ಲಾಕ್ ನ್ಯಾನೊಕಣಗಳ ಡೋಪಿಂಗ್ ನ ಪರಿಣಾಮ

ಪ್ರತೀಕ ತೆಗ್ಗಿನಮಠ1, ರವೀಂದ್ರಾಚಾರಿ1*, ಬಿ ಕೆ ಮಹಾಂತೇಶ1, 2, ಸಹನಕುಮಾರಿ1, ಟಿ ಎಂ ಕೊಟ್ರೇಶ್3, ಆರ್ ರಮಣಿ3.

1 ಭೌತಶಾಸ್ತ್ರ ವಿಭಾಗ, , ಮಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಮಂಗಳಗಂಗೋತ್ರಿ -574 199, 2 ಭೌತಶಾಸ್ತ್ರ ವಿಭಾಗ, ಡಿವಿಎಸ್ ಕಲಾ ಮತ್ತು ವಿಜ್ಞಾನ ಕಾಲೇಜು, ಶಿವಮೊಗ್ಗ-577 201, 3 ಡಿಫೆನ್ಸ್ ಬಯೋ-ಇಂಜಿನಿಯರಿಂಗ್ ಮತ್ತು ಎಲೆಕ್ಟ್ರೋಮೆಡಿಕಲ್ ಲ್ಯಾಬೋರೇಟರಿ (ಡೆಬೆಲ್), ಎ ಡಿ ಇ ಕ್ಯಾಂಪಸ್, ಡಿ ಆರ್ ಡಿ ಒ, ಸಿ.ವಿ. ರಾಮನ್ ನಗರ, ಬೆಂಗಳೂರು, 560 093.

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ಇತ್ತೀಚಿನ ದಿನಗಳಲ್ಲಿ ಡೋಪ್ಡ್ ನ್ಯಾನೊ ಫೈಬರ್ ಸಂಯೋಜನೆಗಳು ವಿಜ್ಞಾನ ಮತ್ತು ತಂತ್ರಜ್ಞಾನದ ವಿವಿಧ ಕ್ಷೇತ್ರಗಳಲ್ಲಿ ಅಪಾರ ಸಂಖ್ಯೆಯ ಅಪ್ಲಿಕೇಶನ್‌ಗಳ ಕಾರಣದಿಂದಾಗಿ ಸಂಶೋಧಕರು ಮತ್ತು ಕೈಗಾರಿಕೋದ್ಯಮಿಗಳಿಂದ ಹೆಚ್ಚಿನ ಗಮನವನ್ನು ಸೆಳೆದುಕೊಂಡಿವೆ. ಸೂಕ್ತವಾದ ಡೋಪಂಟ್‌ಗಳೊಂದಿಗೆ ಡೋಪಿಂಗ್ ಮಾಡುವ ಮೂಲಕ ಸರಿಯಾದ ಅಪ್ಲಿಕೇಶನ್‌ಗೆ ಅಗತ್ಯವಿರುವ ಗುಣಲಕ್ಷಣಗಳನ್ನು ಸಾಧಿಸಬಹುದು. ಡೋಪಿಂಗ್‌ನಿಂದಾಗಿ ಪಾಲಿಮರ್‌ನ' ಬದಲಾವಣೆಗಳು ಮುಖ್ಯವಾಗಿ ಪಾಲಿಮರ್, ಡೋಪಂಟ್ ಮತ್ತು ಡೋಪಂಟ್ ಮತ್ತು ಹೋಸ್ಟ್ ಪಾಲಿಮರ್ ನಡುವಿನ ಪರಸ್ಪರ ಕ್ರಿಯೆಯ ಸ್ವರೂಪವನ್ನು ಅವಲಂಬಿಸಿರುತ್ತದೆ. ಶುದ್ಧ ಮತ್ತು ಕೆಟ್ಜೆನ್ ಬ್ಲಾಕ್ ಡೋಪ್ಡ್ ನ್ಯಾನೊ ಫೈಬರ್ ಸಂಯೋಜನೆಗಳನ್ನು ಸೂಜಿ ರಹಿತ ಎಲೆಕ್ಟ್ರೋಸ್ಪಿನ್ನಿಂಗ್ ತಂತ್ರದಿಂದ ವಿವಿಧ ಡೋಪಂಟ್ ಸಾಂದ್ರತೆಗಳೊಂದಿಗೆ ತಯಾರಿಸಲಾಗಿದೆ. ತಯಾರಾದ ಮಾದರಿಗಳನ್ನು ಎಫ್‌ಟಿಐಆರ್, ಎಸ್‌ಇಎಂ ಮತ್ತು ಡಿಸಿ ವಿದ್ಯುತ್ ವಾಹಕತೆಯ ಅಳತೆಗಳಂತಹ ಅಧ್ಯಯನಗಳನ್ನು ಪರೀಕ್ಷಿಸಲಾಯಿತು. ಫೋರಿಯರ್ ಟ್ರಾನ್ಸ್‌ಫರ್ಮ್ ಇನ್ಫಾರೆಡ್ ಸ್ಪೆಕ್ಟ್ರೋಸ್ಕೋಪಿ ಫಲಿತಾಂಶಗಳು ನ್ಯಾನೊಪಾರ್ಟಿಕಲ್ಸ್ ಪಾಲಿಮರ್‌ನ ಸೂಕ್ತ ಭಾಗಗಳೊಂದಿಗೆ ಸಂವಹನ ನಡೆಸುತ್ತವೆ ಮತ್ತು ಚಾರ್ಜ್-ಟ್ರಾನ್ಸ್‌ಫರ್ ಕಾಂಪ್ಲೆಕ್ಸ್ ಅನ್ನು ರೂಪಿಸುತ್ತವೆ. ಎಫ್‌ಇ-ಸೆಇಎಂ ಅಧ್ಯಯನಗಳು ಸಂಯೋಜನೆಗಳ ಮೇಲ್ಮೈರೂಪವಿಜ್ಞಾನವನ್ನು ಮತ್ತು ಸಂಯೋಜನೆಯೊಳಗೆ ನ್ಯಾನೊಫೈಬರ್‌ಗಳ ರಚನೆಯನ್ನು ದೃಢಪಡಿಸುತ್ತವೆ. ಡೋಪಿಂಗ್ ಮಾಡಿದ ನಂತರ ಮೊಬೈಲ್ ವಾಹಕಗಳು ನ್ಯಾನೊ ಫೈಬರ್‌ಗಳ ಸಂಯೋಜನೆಯ ವಾಹಕತೆಯನ್ನು ಹೆಚ್ಚಿಸುತ್ತದೆ. ಫೈಬರ್ ಸಂಯುಕ್ತದ ಗರಿಷ್ಠ ಡಿಸಿ ವಾಹಕತೆ 1.60 10-6 ನ್ಯಾನೊಕಣಗಳ 15% ಸಾಂದ್ರತೆಗೆ ಕಂಡು ಬಂದಿದೆ.

ಕೀವರ್ಡ್‌ಗಳು: ನೈಲಾನ್-6, ಕೆಟ್ಜೆನ್ ಬ್ಲಾಕ್, ಸೂಜಿರಹಿತ ಎಲೆಕ್ಟ್ರೋಸ್ಪಿನ್ನಿಂಗ್, ನ್ಯಾನೊ ಫೈಬರ್, ವಾಹಕತೆ

EFFECT OF KETJEN BLACK NANOPARTICLES DOPING ON STRUCTURAL, MORPHOLOGICAL AND ELECTRICAL PROPERTIES OF NYLON-6 POLYMER

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Pristine and ketjen black doped nanofibers composites are prepared by needleless electrospinning technique with different dopant concentrations. The prepared samples were examined with distinct characterizations such as FTIR, SEM and DC electrical conductivity measurements. Fourier transform infrared spectroscopy outcomes states that the induced nanoparticles interact with appropriate segments of polymer and forms a charge-transfer complex. FESEM studies demonstrate the surface morphology of composites and confirm the nanofibers formation within the composite. Upon doping mobile carriers created in the composite and would enhance the conductivity of nanofibers composite. The maximum DC conductivity of the composite is found to be 1.60 10 -6 (S/cm) for 15 wt.% KB dopant concentrations.

Keywords: Nylon-6, Ketjen Black, needleless electrospinning, nanofibers, conductivity

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ಖಾಸ್ಗರೀಯಂ - 12

ಆಚಾರ್ಯ ಗಣೇಶ ದೈವಜ್ಞನ ಖಗೋಲ ಕೃತಿಯ ವೈಶಿಷ್ಟ್ಯತೆಗಳು ಹಾಗೂ ಗಣಿತದ ಪರಿಣಾಮಕಾರಿತ್ವ

ಡಾ॥ ಎಸ್.ಕೆ. ಉಮಾ
ಗಣಿತ ಪ್ರಾಧ್ಯಾಪಕರು ಹಾಗೂ ವಿಭಾಗ ಮುಖ್ಯಸ್ಥರು, ಸರ್ ಎಂ. ವಿಶ್ವೇಶ್ವರಯ್ಯ ತಾಂತ್ರಿಕ ಮಹಾವಿದ್ಯಾಲಯ, ಹುಣಸೆಮಾರನಹಳ್ಳಿ, ಬೆಂಗಳೂರು-562157

ಭಾರತೀಯ ಗಣಿತಶಾಸ್ತ್ರದ ಸುಪ್ರಸಿದ್ಧ ಕರಣ ಗ್ರಂಥಗಳಲ್ಲಿ ಆಚಾರ್ಯ ಗಣೇಶ ದೈವಜ್ಞನ "ಗ್ರಹಲಾಘವ"ವು ಪ್ರಮುಖವಾದುದು. ಪಾರಂಪರಿಕವಾದ ಪಂಚಾಂಗಗಣಿತದಲ್ಲಿ ಈ ಗ್ರಂಥವು ಅತ್ಯಂತ ಜನಪ್ರಿಯವಾಗಿದೆ. ಇದಕ್ಕೆ ಪ್ರಮುಖ ಕಾರಣವೆಂದರೆ ಗಣೇಶ ದೈವಜ್ಞನು ಪಂಚಾಂಗಕರ್ತೃಗಳಿಗೆ ಕಠಿಣವೆನಿಸುವ ತ್ರಿಕೋಣ ಜ್ಯಾಮಿತಿಯ ಜ್ಯಾ ಹಾಗೂ ಕೋಟಿಜ್ಯಾ ಅಂಶಗಳನ್ನು ಸಂಪೂರ್ಣವಾಗಿ ತ್ಯಜಿಸಿ, ಅತ್ಯಂತ ಸರಳ ಹಾಗೂ ಸುಲಭ ಗಣಿತ ವಿಧಾನವನ್ನು ಬಳಸಿರುವುದು. ಇದರಿಂದ ಗ್ರಹಗಣಿತವು ಇತರೆ ಸಾಂಪ್ರದಾಯಿಕ ಗ್ರಂಥಗಳ ಲೆಕ್ಕಾಚಾರಕ್ಕಿಂತ ಸರಳವೆನಿಸಿದೆ. ಮುಖ್ಯವಾಗಿ ಗಮನಿಸಬೇಕಾದ ಅಂಶವೆಂದರೆ ತ್ರಿಕೋನ ಜ್ಯಾಮಿತಿಯ ಜ್ಯಾ ಹಾಗೂ ಕೋಟಿಜ್ಯಾಗಳ ಪರಿತ್ಯಾಗವು ಖಗೋಳ ಗಣಿತದ ನಿಖರತೆಯನ್ನು ಯಾವ ರೀತಿಯಲ್ಲಿಯೂ ಕಡಿಮೆ ಮಾಡಿಲ್ಲದಿರುವುದು. ಲೆಕ್ಕಾಚಾರವನ್ನು ಕರಾರುವಾಕ್ಕಾಗಿಸಲು ಜ್ಯಾ ಹಾಗೂ ಕೋಟಿಜ್ಯಾಗಳಿಗೆ ಅತ್ಯಂತ ಸಮರ್ಪಕವಾಗಿ ಹಾಗೂ ಸಂದರ್ಭೋಚಿತವಾಗಿ ಸನ್ನಿಹಿತ ಬೆಲೆಗಳನ್ನು ಬೀಜಗಣಿತ ಸೂತ್ರಗಳನ್ನು ಬಳಸಿ ಗ್ರಹ ಹಾಗೂ ಗ್ರಹಣಗಳ ಲೆಕ್ಕಾಚಾರದ ವಿಧಾನಗಳನ್ನು ಗಣೇಶ ದೈವಜ್ಞನು ನೀಡಿದ್ದಾನೆ. ಪ್ರಸ್ತುತ ಪ್ರಬಂಧದಲ್ಲಿ ಆಚಾರ್ಯ ಗಣೇಶ ದೈವಜ್ಞನ ಕಾಲ, ಕೃತಿ ಮತು ಅವನು ಅಳವಡಿಸಿದ ಸುಲಭ ಹಾಗೂ ಸರಳ ಗಣಿತ ವಿಧಾನಗಳ ವೈಶಿಷ್ಟ್ಯತೆ ಮತ್ತು ಪರಿಣಾಮಕಾರಿತ್ವಗಳನ್ನು ಉದಾಹರಣೆಗಳೊಂದಿಗೆ ವಿವರವಾಗಿ ಪ್ರಸ್ತುತಪಡಿಸಲಾಗಿದೆ.

ಖಾಸ್ಗರೀಯಂ - 13

ಘನ ಸ್ಥಿತಿಯ ಬ್ಯಾಟರಿ ಅನ್ವಯಗಳಿಗಾಗಿ ಪಾಲಿಮರ್ ಮಿಶ್ರಿತ ಎಲೆಕ್ಟ್ರೋಲೈಟ್ಗಳನ್ನು ನಡೆಸುವ Li ಐಯಾನ್ನ ಆಪ್ಟಿಕಲ್ ಮತ್ತು ವಿದ್ಯುತ್ ಗುಣಲಕ್ಷಣಗಳು

ರೋಹನ್ ಎನ್ ಸಾಗರ್ 1, ವಿ. ರವೀಂದ್ರಾಚಾರಿ 1*, ಶ್ರೀದತ್ತ ಹೆಗ್ಡೆ 1, ಮಹಾಂತೇಶ್ ಬಿ ಕೆ1, 2
1ಭೌತಶಾಸ್ತ್ರ ವಿಭಾಗ, ಮಂಗಳೂರು ವಿಶ್ವವಿದ್ಯಾಲಯ, ಮಂಗಳಗಂಗೋತ್ರಿ -574199, 2ಭೌತಶಾಸ್ತ್ರ ವಿಭಾಗ, ಡಿವಿಎಸ್ ಕಲಾ ಮತ್ತು ವಿಜ್ಞಾನ ಕಾಲೇಜು, ಶಿವಮೊಗ್ಗ -577201, ಡಾ.ವಿ.ರವೀಂದ್ರಾಚಾರಿ - *ಇಮೇಲ್: vravi2000@yahoo.com

ಶುದ್ಧ ಮತ್ತು Li-ಉಪ್ಪು ಡೋಪ್ಡ್ ಪಾಲಿಮರ್ ಎಲೆಕ್ಟ್ರೋಲೈಟ್ ಫಿಲ್ಮ್ಗಳನ್ನು ದ್ರಾವಣ ಎರಕಹೊಯ್ದ ತಂತ್ರವನ್ನು ಬಳಸಿ ತಯಾರಿಸಲಾಗುತ್ತದೆ. ಯುವಿ-ವಿಸಿಬಲ್ ಸ್ಪೆಕ್ಟ್ರಾದಿಂದ, ಐ-ಉಪ್ಪು ಡೋಪ್ಡ್ ಮಿಶ್ರಣ ಸಂಯೋಜನೆಗಳ ಹೀರಿಕೊಳ್ಳುವ ಸ್ಪೆಕ್ಟ್ರಲ್ ಪ್ರತಿಕ್ರಿಯೆಯು ಹೀರಿಕೊಳ್ಳುವಿಕೆಯಲ್ಲಿ ಕೆಂಪು ಬದಲಾವಣೆಯನ್ನು ತೋರಿಸುತ್ತದೆ ಆಪ್ಟಿಕಲ್ ಶಕ ಬ್ಯಾಂಡ್ ಅಂತರವು ಕಡಿಮೆಯಾಗುತ್ತದೆ. ಪಿವಿಎ-ಸಿಎಸ್ ಪಾಲಿಮರ್ ಮಿಶ್ರಣದ ಎಫ್ಟಿಐಆರ್ ಸ್ಪೆಕ್ಟ್ರಾ Li-ಉಪ್ಪನ್ನು ಸೇರಿಸಿದ ನಂತರ ಅವುಗಳ ಗರಿಷ್ಠ ಸ್ಥಾನಗಳಲ್ಲಿ ಬದಲಾವಣೆಯೊಂದಿಗೆ ಗಣನೀಯ ರಾಸಾಯನಿಕ ಮರ್ಪಾಡುಗಳನ್ನು ತೋರಿಸುತ್ತದೆ. ವಿದ್ಯುತ್ ಗುಣಗಳು ಅಧ್ಯಯನವು ಪಾಲಿಮರ್ ಮಿಶ್ರಣ ಸಂಯೋಜನೆಗಳಲ್ಲಿ ವಾಹಕತೆಯ ವರ್ಧನೆ ತೋರಿಸಿದೆ (7.70X10-5 Scm-1).

ಕೀವರ್ಡ್ಗಳು: PVA-CS ಪಾಲಿಮರ್ ಮಿಶ್ರಣ, ಆಪ್ಟಿಕಲ್ ಗುಣಲಕ್ಷಣಗಳು, ವಿದ್ಯುತ್ ಅಧ್ಯಯನಗಳು.

OPTICAL AND ELECTRICAL PROPERTIES OF LI+ ION CONDUCTING POLYMER BLEND ELECTROLYTES FOR SOLID STATE BATTERY APPLICATIONS

Rohan N Sagar1, V. Ravindrachary1*, Shreedatta Hegde1, Mahantesha B K1, 2
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Pure and Li-salt doped polymer blend electrolyte films are prepared using solution cast technique. From the UV-Visible spectra, it is observed that the absorption spectral response of Li+ salt doped polymer blend composites showed red shift in the absorption and the optical energy band gap of pure polymer blend is decreased upon doping. The FTIR spectra of PVA-CS polymer blend shows considerable chemical modifications with slight shift

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SUB THEM: 7. COLLABORATIVE AND CO-OPERATIVE LEARNING IN CHOICE BASED CREDIT SYSTEM

EFFECTIVENESS OF CO-OPERATIVE AND COLLABORATIVE TECHNIQUES IN LEARNING PHYSICS

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Abstract:

Physics is crucial in understanding the world around us, the world inside us, and the world beyond us. It is the most basic and fundamental science. Not only in our country, but also, in many countries there has been a decline in the number of students wishing to continue with physics. A number of factors have been identified by previous researchers as contributing to this decline. They have noted that Physics has an image of both "difficult" and "boring". In order to improve the quality of interaction between teachers and learners, the students must be more engaged in learning and better able to achieve the desired outcomes of education. Students find Physics hard essentially because they have difficulties in understanding the logical reasoning. It is found that the students are reluctant towards the subject Physics. There are negative attitudes of students towards science especially; they do not like Physics courses and Physics teachers. In order to shift, learning Physics from teacher centric method to pupil centric method, cooperative and collaborative learning techniques have been found very effective. This paper focuses on how various cooperative and collaborative learning techniques can bring a paradigm shift in learning Physics.

Key words: Science education, learning Physics, cooperative and collaborative techniques

Introduction

Physics is a "search for" and the "application of rules" that can help us understand and predict the world around us. Central to physics are ideas such as energy, mass, particles and waves. Physics attempts to both answer the philosophical questions about the nature of the universe and provide solutions to technological problems. Physics is crucial in understanding the world around us, the world inside us, and the world beyond us. It is the most basic and fundamental science. Physicists are problem solvers. Their analytical skills make physicists versatile and adaptable so they work in interesting places.

In many countries there has been a decline in the number of students wishing to continue with physics (Woolnough, 1994). A number of factors have been identified by previous researchers as contributing to this decline. Smithers (2006) noted that the study of physics in schools and universities in spiralling into decline as many teenagers believe it is too difficult. They have noted that Physics has an image of both "difficult" and "boring". It is observed that the major general reasons for students finding physics uninteresting are that it is seen as difficult and irrelevant: physics deals with abstract concepts and students find these concepts difficult to grasp.

In order to improve the quality of interaction between teachers and learners, the students must be more engaged in learning and better able to achieve the desired outcomes of education. It calls for all educators to reflect on why they teach, what they teach and how they teach.

AAAS (1990) noted that the collaborative nature of scientific and technological work should be strongly reinforced by frequent group activity in the classroom. Scientists and engineers work mostly in groups and less often as isolated investigators. Vygotsky (1978) emphasized that sociocultural theory posits the interwoven nature of learning and development within and among students as they engage in activities in a classroom community. Learning often takes place best when students have opportunities

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VIDYA SAMSTHE (R), SHIKARIPURA

Innovative Pedagogy And Effective Teaching-Learning To Promote NEP-2020

Editors

Shivakumar G S
Ravi H
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INNOVATIVE PEDAGOGY & EFFECTIVE TEACHING LEARNING TO PROMOTE NEP - 2020

EDITORS

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SILVER JUBILEE YEAR

Swamy Vivekananda Vidya Samsthe (R), Shikaripura

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FORWORD

Sri. B.Y. Raghavendra
Secretary,
Swamy Vivekananda Vidya Samsthe(R), Shikaripura
and Member of Parliament, Shivamogga Constituency

Education is a weapon to improve one's life. It is probably the most important tool to change one's life. Education certainly determines the quality of an individual's life and it improves one's knowledge, skills and develops the personality and attitude. Education for all is a Universal commitment', it is necessary to ensure that every child and adult receives basic education of good quality, this is a commitment which is based both on a human rights perspective, and on the generally held belief that education is central to individual wellbeing and national development. Education is a dynamic process. It is an effective mechanism of bringing the expected changes in the societal set up. These changes bring forth novelty, newness and sometimes visible transformation in the attitude and perceptions of the people. Thus, the education is considered remedies for all these challenges. Right to education is emphasized in the Indian Constitution as a fundamental right. Every child in our country must be given free and compulsory education. The Government is trying its best to enforce the RTE; it leaves no stone unturned while exploring the ways and means of giving education.

Providing quality education for all remains one of the biggest development challenges today, legislation and policies it is possible to contribute to build a world of Inclusion, not only for people with disabilities but also for all those who are unable to exercise their basic human right to education. Inclusion includes accessibility: that is physical, psychological, economic, social etc., A New Education Policy-2020 aims to facilitate an inclusive, participatory and holistic approach, which takes into consideration field experiences, empirical research, stakeholder feedback, as well as lessons learned from best practices. It is a progressive shift towards a more scientific approach to education. The prescribed structure will help to cater the ability of the child – stages of cognitive development as well as social and physical awareness. If implemented in its true vision, the new structure can bring India at par with the leading countries of the world.

We at Kumadvathi College of Education, a Unit of Swamy Vivekananda Vidya Samsthe believe that Teacher education institutions should develop effective teachers who are the facilitators

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of all the positive abilities among the school goers regardless of their background and abilities, because we need teacher who can enable the children, think globally and act locally.

The Two-day National Level Conference organised by Kumadvathi College of Education has rightly chosen a very contemporary theme of "Innovative Pedagogy and Effective Teaching Learning to Promote NEP-2020". This conference would provide a platform for all the concerned in enriching their thoughts through discussions. This synergy may be of great help for the qualitative expansion of higher education.

My regards to the Management of the SVVS trust who were instrumental for bring out such a useful book to this field. The efforts of the seminar Director and the organising team is worth mentioning. They have provided an opportunity to all the educators and researchers to share their knowledge at a common platform and ponder with the issues and challenges of the present education system.

With immense pleasure, I wish the entire paper presenters, participants, all our delegates, chairpersons, panellists, resources persons and government officials for their involvement in this great cause.

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FROM THE EDITOR

There is a widespread notion that educational systems should empower learners with skills and competences to cope with a constantly changing landscape. Reference is often made to skills such as critical thinking, problem solving, collaborative skills, innovation, digital literacy, and adaptability. What is negotiable is how best to achieve the development of those skills, in particular which teaching and learning approaches are suitable for facilitating or enabling complex skills development.

The acquisition of skills to embrace complex challenges and the development of the person as a whole, valuing common prosperity, sustainability and wellbeing. Wellbeing is perceived as "inclusive growth" related to equitable access to "quality of life, including health, civic engagement, social connections, education, security, life satisfaction and the environment". To achieve this vision, a varied set of skills and competences is needed, that would allow learners to act as "change agents" who can achieve positive impact on their surroundings by developing empathy and anticipating the consequences of their actions.

Innovation and diffusion of knowledge are at the heart of the growth process, be it in the area of education or industry. Continuous innovation is, therefore, crucial for all the educational systems. The skill to think and to innovate is a desirable 21st century skill from the students. Innovation in education encourages students and demands teachers to be proactive to research, explore, and use multiple strategies to come out with novel ideas or a strategy to uncover something new.

Innovation involves a different way of looking at problems and solving them.. It also contributes to improve overall quality of education because it catalyses students to think out of the box, and helps to solve complex problems. The school environment must focus on giving space and encouragement for teachers to innovate. Increasingly, innovation in education at school is more than just a buzzword. It is fast becoming a way of learning and teaching for both students and teachers respectively. It is commendable that India is moving forward on innovations, as the Global Innovation Index Report 2020 (World Intellectual Property Organization (WIPO)) has ranked India as the 48th most innovative nation in the world amongst 131 countries.

To make children innovative they have to be nurtured in such a way that it becomes their second nature. For this, the teachers have to be geared up for facing the upcoming challenges in the rigid classroom settings. Walking on a new and uncharted path, one has to overcome fears, take risks and be ready to face failures too. However, if the teachers think out of the box, there are many ways that teachers can gradually attempt to introduce innovation in the classroom. With NEP -2020 in place now and the new curriculum framework for teacher educators in the making, it is imperative that it should be framed in a way that there are enough opportunities and sufficient time for the prospective teachers to think, reflect and innovate.

The fundamental principles of the National Education Policy 2020 are to identify and foster the unique capabilities of each student by promoting creativity and critical thinking to encourage logical decision-making and innovation. It also facilitates extensive use of technology in teaching and learning, removing language barriers and educational planning and management. It encourages innovation and out-of-the-box ideas through autonomy, good governance, and empowerment. It promotes outstanding research as a requisite for outstanding education and deployment. NEP-2020

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envisions nurturing innovation in all domains of education and recommends the need to innovate in all fields of education. It emphasises on promoting creativity and critical thinking, which contribute to innovation.

The articles in the book are the expressions of the authors towards variety of issues pertaining to higher education. These papers are classified into three main sub themes viz., Pedagogical approaches in teaching learning process, Techno Pedagogical content knowledge in teaching learning and Teacher Standard Professionalism from different sections of higher education, hence there are variety issues addressed in them. Though research-based articles are less in number the thematic articles have been successful to a great extent in addressing the various issues of the different areas of higher education.

We are thankful to SwamyVivekananda Vidya Samsthe which is a pioneer institution in Shivamogga District has been always a source of support andinspiration, Sri B.S. Yediyurappa, the Ex. Chief Minister of Karnataka and the Mentor of this Institution, Sri B.Y Raghavendra, Member of Parliament, Shivamogga Constituency and the Secretary of our Trust has been with us all the times extending continuous support for this seminar. Sri. M.B. Shivakumar, President of SVVS Trust. Our thanks are due to all the Board of Trustees of SVVs for their timely encouragement. The Kuvempu University has been continuously encouraging usin the academic growth of our institution, Our sincere thanks to the Vice Chancellor, Registrar and all the authorities of the University with special reference to the Dean, Chairman and faculty members of the Department of Education.

The Members of the Editorial Board have worked day and night to bring out this document successfully; their efforts in this regard are commendable. The orgnising team of the National conference and all my staff members have worked tirelessly since months for the success of this event. Their efforts are worth appreciating. Above and all Our sincere thanks are due to all the authors, paper presenters, participants of National conference without whom this publication would not have been possible. We sincerely thank the publisher for rendering the kind help to bring out this compilation.

Once again, our sincere thanks are due to all those who helped us directly or indirectly for the success of the conference.

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Abstract:

Physics is crucial in understanding the world around us, the world inside us, and the world beyond us. It is the most basic and fundamental science. Not only in our country, but also, in many countries there has been a decline in the number of students wishing to continue with physics. A number of factors have been identified by previous researchers as contributing to this decline. They have noted that Physics has an image of both "difficult" and "boring". In order to improve the quality of interaction between teachers and learners, the students must be more engaged in learning and better able to achieve the desired outcomes of education. Students find Physics hard essentially because they have difficulties in understanding the logical reasoning. It is found that the students are reluctant towards the subject Physics. There are negative attitudes of students towards science especially; they do not like Physics courses and Physics teachers. In order to shift, learning Physics from teacher centric method to pupil centric method, cooperative and collaborative learning techniques have been found very effective. This paper focuses on how various cooperative and collaborative learning techniques can bring a paradigm shift in learning Physics.

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Introduction

Physics is a "search for" and the "application of rules" that can help us understand and predict the world around us. Central to physics are ideas such as energy, mass, particles and waves. Physics attempts to both answer the philosophical questions about the nature of the universe and provide solutions to technological problems. Physics is crucial in understanding the world around us, the world inside us, and the world beyond us. It is the most basic and fundamental science. Physicists are problem solvers. Their analytical skills make physicists versatile and adaptable so they work in interesting places.

In many countries there has been a decline in the number of students wishing to continue with physics (Woolnough, 1994). A number of factors have been identified by previous researchers as contributing to this decline. Smithers (2006) noted that the study of physics in schools and universities in spiralling into decline as many teenagers believe it is too difficult. They have noted that Physics has an image of both "difficult" and "boring". It is observed that the major general reasons for students finding physics uninteresting are that it is seen as difficult and irrelevant: physics deals with abstract concepts and students find these concepts difficult to grasp.

In order to improve the quality of interaction between teachers and learners, the students must be more engaged in learning and better able to achieve the desired outcomes of education. It calls for all educators to reflect on why they teach, what they teach and how they teach.

AAAS (1990) noted that the collaborative nature of scientific and technological work should be strongly reinforced by frequent group activity in the classroom. Scientists and engineers work mostly in groups and less often as isolated investigators. Vygotsky (1978) emphasized that sociocultural theory posits the interwoven nature of learning and development within and among students as they engage in activities in a classroom community. Learning often takes place best when students have opportunities

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to express ideas and get feedback from their peers (AAAS, 1990). Students take action and interact with others to construct the contextual knowledge of the classroom. Their learning of and about science is therefore inseparable from the surrounding environment in which it takes place.

Cooperative and Collaborative learning:

Cooperative and collaborative learning are instructional contexts in which peers work together on a learning task, with the goal of all participants benefiting from the interaction. Cooperation and collaboration can be treated as synonymous, as a truly cooperative context is always collaborative. The terms cooperative learning and collaborative learning are often used interchangeably. The main purpose of these pedagogical methods is to provide students with good opportunities in making them engage in thoughtful learning activities. Collaborative learning is a method of teaching and learning in which students team together to explore a significant question or create a meaningful project.

Elements of cooperative and collaborative learning:

Basically there are five elements involved in cooperative and collaborative learning. These elements, distinguish cooperative and collaborative learning from other forms of group learning. They are as follows

1. Face to face interaction
2. Positive interdependence
3. Individual and group accountability
4. Collaborative / Interpersonal skills
5. Group processing

1. Face to face interaction: Face to face refers to direct interaction. It doesn't necessarily mean to personal interaction but every individual communicates with the other member of the group either through an email, Skype, over the phone, chat etc. This results in students promoting each other's success by sharing the knowledge and the skills. They support and encourage each other's contribution in achieving the goal.

2. Positive interdependence: This means that the members in the group rely on each other. Through this they realise that they have to sink or swim together i.e., Everyone's effort in achieving the goal is held accountable and also it not only benefits an individual but for everyone in the group.

3. Individual and group accountability: In a group task it is too often that some members in the group do all of the work and others just sit idle. To avoid this lethargic attitude of students every individual is held accountable in every task assigned in the group. When every individual sincerely performs the task assigned that in turn gives favourable result to the group.

4. Collaborative / Interpersonal skills: A basic team work is required to complete the assigned task. The ability to perform a task in a group requires appropriate skill. Some skills come naturally and some must be attained in due course. Through these group activities, students learn to share the skills with the other members of the group and keep the group encouraged and motivated.

5. Group processing: Group members must know what to do, how to do, and how swiftly a task can be completed. Group processing refers to monitoring the group and ensuring that the members of the group are working efficiently.

Need of Co-operative and Collaborative techniques in learning Physics:

Many researchers have found out that the students perceive physics to be a difficult/ hard subject. Students find physics hard essentially because they have difficulties in understanding the logical reasoning. It is found that the students are reluctant towards the subject physics. There are negative attitudes of students towards science especially; they do not like physics courses and physics teachers.

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Based on this premise, numerous studies have been conducted to determine the factors that affect the students' attitudes in physics.

Collaborative and cooperative learning is one such arena which is being tried out to make learning more meaningful in many research-oriented areas. This technique is expected to be more relevant in teaching physics. The discipline demands the grasp of concepts often with the help of concepts learnt earlier. Concepts have to be learnt, they have to get reinforced and further they help in understanding a new chunk of knowledge. A thorough grounding in mathematics is an absolute prerequisite. This necessitates employing interventions and devise strategies which help best in learning physics. Collaborative and cooperative learning is an attempt which is a departure from the teacher centric method to pupil centric. Teachers acts as a facilitator. He remains in the background after setting up the learning task. He assists and guides but never takes the centre stage. He uses a constructive approach wherein the learners construct knowledge from their previous experiences. There is a paradigm shift in learning physics. Not all topics in physics are ideally suited but some are eminently suitable. The role of teacher assumes a great significance for he has to do quite an amount of spadework before embarking upon this attempt. He has to meticulously plan the work; else it will be directionless instead of a goal directed activity.

Tools for Cooperative and Collaborative techniques:

Many of the researchers have found out that majority of students (especially high school students) face difficulty in learning Physics. This attitude of students may be for various reasons like problem solving in Physics, logical reasoning, deriving the laws or memorising the laws. In order to overcome these difficulties few teaching-learning methods could be adopted.

The tools chosen for Cooperative and Collaborative techniques are as follows:

1. T-chart:

This tool can be used during the class lecture, watching a video, to summarize a reading or a field experience. The students record points from facts or ideas in the facts column. Then the students work in pairs to share their notes and ensure that all have the necessary information. Then, the students draw images or symbols to represent the facts or ideas. If time, students may be given an opportunity to share their visuals.

2. The interview matrix:

The teacher creates a few key questions that will be used to help students to review a topic. The questions will be somewhat open ended so that they cannot be answered with yes/no or short one word/ one sentence answer.

In a class of 40, students can be divided into 5 groups. Each group will have 8 students in it. The teacher assigns 8 questions to each group (one question to each student). Each student is given time to interview the other students in their group to collect information related to the question that they have been given. Depending on the situation, the time is allotted. The questions will be related to a chapter and the task of the students is to completely understand the concept and by the collection of composite list of information they have to share this with the whole class.

Each group reports on the information they have collected. The teacher can lead the activity and there is opportunity for both the students and teacher to comment, extend, refine or offer alternative ideas.

This technique is useful for a number of purposes:

1. To find out what students know about a topic or process at the beginning of a class.
2. To review material from a class or unit of a course.
3. To have students explore a topic by having them interview practitioners in the field.

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3. Find the Fib:

In this method the teacher states some facts or statements among which one will be wrong. The team mates should identify which one is the fib and explain the concept.

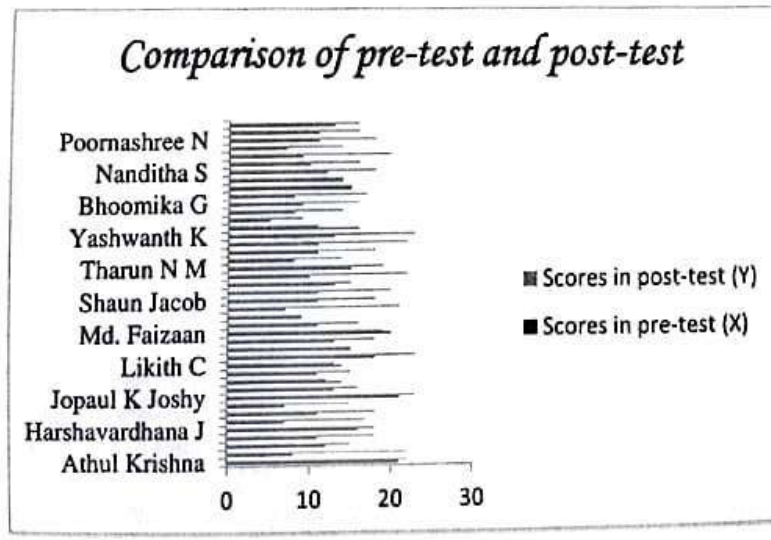
A STUDY AND DATA COLLECTION

In this regard, a study was made on the students of class 9 where the teacher evaluated the understanding of the concept and the difficulties faced by the students through the diagnostic test after which they adopted various co-operative and collaborative learning techniques which supported the teaching-learning process. After implementing these techniques, again the test was conducted and the results were surprising.

After the traditional way of teaching, to test the present level of knowledge of the students, a test was conducted and the scores were measured. After this pre-test, cooperative and collaborative learning techniques were implemented. Later, a post test was conducted and the scores were recorded. The scores of 43 students were collected and the study was made. After the comparative study and analysing the graph it was clearly evident that cooperative and collaborative learning techniques had brought a significant changes in the score card of majority of students

COMPARISON OF MEAN AND STANDARD DEVIATION

Test	Mean	Standard Deviation	t value	Significance
Pre test	12.186	4.024	2.16053	There is significant difference
Post test	16.953	3.9705		



Bar graph of comparison of pre-test and post-test scores

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Conclusion

In the 21st century, team work was deemed as essential part of the learning curve in the class room. Bringing students to work together for the good of learning can be tracked back even to Socrates. The issue with integration of children into the teamwork spirit is the fact that it may result in more work for the teacher initially. In order to improve the learning techniques of the students these co-operative and collaborative techniques are found to be very useful. Through these learning strategies an improvement in the students is seen.

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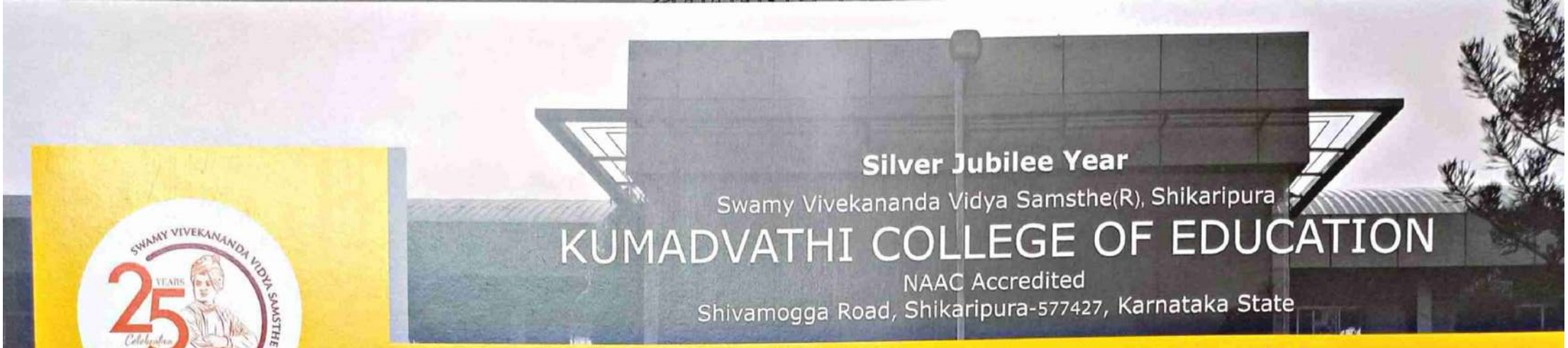

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