Enhanced dielectric properties of graphene and conjugated terpolymer-blended polyvinylidene difluoride

Published: 07 June 2023

Volume 46, article number 118, (2023) Cite this article

Bulletin of Materials Science

Aims and scope

Submit manuscript

Narayanasamy Kavitha, Ayyavu Chandramohan, Krishnan Srinivasan, Peethambaram Prabukanthan & Kannaiyan Dinakaran

Abstract

In this study, electrically conductive composites of ethylenedioxythiophene-based terpolymer (PETCH), polyvinylidene difluoride (PVDF) and graphene nanosheets (GNS) have been prepared by compression molding and characterized. A new conjugated PETCH polymer was synthesized and its chemical structure has been confirmed by Fourier transform infrared and 1H-NMR spectroscopy. The varying weight percentages of (1, 3 and 5%) GNS and 10 wt% PETCH dispersed PVDF nanocomposites were prepared and

Journal of Macromolecular Science, Part A ›
Pure and Applied Chemistry
Volume 60, 2023 - Issue 3

Research Articles

High performance bismuth oxide embedded sulfonated poly ether sulfone composite membranes for fuel cell applications

Praveen Thangamuthu, Siva Moorthy, Berlina Maria Mahimai, Dinakaran Kannaiyan & **Paradesi Deivanayagam**

Pages 171-180 | Received 28 Nov 2022, Accepted 27 Feb 2023, Published online: 13 Mar 2023

Cite this article https://doi.org/10.1080/10601325.2023.2186793 Check for updates

Abstract

Organic-inorganic sulfonated poly(ether sulfone) (SPES)-bismuth oxide (Bi_2O_3) composite membranes were prepared by the facile solution casting method. Poly(ether sulfone) (PES) polymer was sulfonated using concentrated sulfuric acid as a sulfonating agent

International Journal of Polymer Analysis and Characterization ›
Volume 28, 2023 - Issue 2

Articles

Enhanced thermal and dielectric properties of porous thin films of graphene, conjugated terpolymer of pyrene/thiophene/heptaldehyde, and polyvinylidene difluoride alloys

Kavitha Narayanasamy, Prabukanthan Peethambaram, Debmalya Roy, Uthayakumar Sivaperumal & **Dinakaran Kannaiyan**

Pages 139-155 | Received 23 Aug 2022, Accepted 09 Dec 2022, Published online: 21 Dec 2022

Cite this article https://doi.org/10.1080/1023666X.2022.2158581 Check for updates

Abstract

We have developed conductive, lightweight, and porous composite of polyvinylidene d Loading [Contrib]/a11y/accessibility-menu.js ized conjugated terpolymer and graphene for

Journal of Applied Polymer Science / Volume 140, Issue 15 / e53737

RESEARCH ARTICLE

TiO_2 nanoparticle enhanced high temperature proton conductivity in hyperbranched sulfonated polyarylene aliphatic ketones for proton exchange membrane fuel cell applications

Theerthagiri Senthil, Peethambaram Prabukanthan, Deivanayagam Paradesi, Kannaiyan Dinakaran ✉

First published: 16 February 2023
https://doi.org/10.1002/app.53737
Citations: 2

Abstract

A new hyperbranched sulfonated poly(arylene aliphatic ketones) (HB-SPAAK) has been synthesized and loaded with titania nanoparticles to obtain HB-SPAAK/TiO_2 nanocomposites for thermally stable proton-conducting electrolyte membrane fuel cell (PEMFC) applications. The synthesis of HB-SPAAKs was carried out through the polycondensation reaction of different aliphatic and aromatic acids with simultaneous loss of H_2O, trifluromethane sulfonic acid used as catalyst. The long chain hyperbranched polymers and TiO_2-loaded nanocomposites were characterized by FT-IR, ^{1}H-NMR, SEM and HR-TEM. Proton conductivity (PC), swelling ratio, water uptake and oxidative stability. The SEM image of TiO_2 NPs and HB-SPAAKs/TiO_2 nanocomposites membrane clearly showed the spherical of TiO_2 and porous structure of HB-SPAAKs with a pore diameter of 2–50 μm. TEM image reveals the uniform particle size distribution of TiO_2 nanoparticles having a nanosize of 100 nm. TiO_2 loaded polymer nanocomposites showed lower values of W/U and S/R when compared to the unmodified HB-SPAAK, while 3% TiO_2 loaded HB-SPAAKs exhibited a threefold increment of proton conductivity of 1.439×10^{-2} S cm^{-1} compared to HB-SPAAKs (0.41 x 10^{-2} S cm^{-1}) and lower than that of Nafion 117 (0.1003 S cm^{-1} at 80°C). The 5% TiO_2 NPs-embedded with HB-SPAAKs nanocomposites membranes also presented admirable oxidative stability with a degradation value of 13.8% during immersion in Fenton reagent for 8 h at 70°C.

ScienceDirect

International Journal of Hydrogen Energy

Volume 48, Issue 72, 22 August 2023, Pages 28103-28118

Review Article

Neoteric advancements in polybenzimidazole based polymer electrolytes for high-temperature proton exchange membrane fuel cells - A versatile review

Siva Moorthy [a], Gandhimathi Sivasubramanian [b], Dinakaran Kannaiyan [c], Paradesi Deivanayagam [d]

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https://doi.org/10.1016/j.ijhydene.2023.04.005

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Highlights

- A simple and reproducible procedure is used to prepare polybenzimidazole based membranes.
- Phosphoric acid-doped PBI performs extremely well as HT-PEM.
- The unique cross-linked membranes exhibit outstanding fuel cell performance and high proton conductivity.
- This review highlights the fabricating of PBI-based PEMs to address the current problems of HT-PEMFCs.

Abstract

The world's dependence on hydrocarbon fuel to generate power has proven to be the primary source of energy production. The emission of dangerous toxic and effluent gases during the process of hydrocarbon extraction and utilisation poses a massive threat to the environment and human life. This has driven the

Polymers for Advanced Technologies / Volume 34, Issue 7 / p. 2261-2271

RESEARCH ARTICLE

TiO_2-graphene dispersed sulfonated polyphenylenesulfide sulfone nanocomposites for medium temperature PEMFCs

Senthil Theerthagiri, Srinivasan Krishnan, Paradesi Deivanayagam, Chandran Muthiah, Dinakaran Kannaiyan

First published: 31 March 2023
https://doi.org/10.1002/pat.6047

Abstract

Sulfonated polyphenylene sulphide sulfone (sPPSS) loaded with titania-graphene (TiO_2-GNS) was synthesized by the polycondensation method and studied their suitability towards proton exchange membrane fuel cell applications. The structural, morphological, and physic-chemical properties of sPPSS nanocomposites containing varying amounts of (1%, 2%, 3%, and 5%) TiO_2-GNS was investigated by Fourier transform infrared, H^1-NMR, P-XRD, FE-SEM, HR-TEM, Raman spectrum, swelling ratio (SR), water uptake, thermal analysis, oxidative stability (OS) and proton conductivity. Further, the obtained TiO_2-GNS dispersed polymer membrane exhibits greatly reduced water absorption 4.44% and a less volume SR (15.6%). The 5 wt% TiO_2-GNS dispersed sPPSS nanocomposites exhibited a PC value around 2.03×10^{-2} S/cm at 110°C. The sPPSS nanocomposites membrane confirmed admirable OS with a maximum degradation of 39.15% during immersed in the Fenton reagent for 6 h at 80°C.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

Open Research

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Journal of the Indian Chemical Society

Volume 100, Issue 10, October 2023, 101091

Enhanced electromagnetic interference shielding in nickel oxide and graphene composite nanostructures loaded polyvinylidene difluoride thin films

K. Dinakaran [a], S. Senthamilselvi [a], T. Gayathri [a], N. Kavitha [a], Debmalya Roy [b]

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https://doi.org/10.1016/j.jics.2023.101091

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Highlights

- NiO/graphene loaded PVDF having enhanced microwave absorption and electromagnetic interference shielding has been formulated.
- The dissemination of the NiO nanoparticles throughout the PVDF matrix is achieved.
- The 10 wt% of NiO/Graphene/PVDF composites showed highest conductivity of 6.8×10^{-14} at 1KHz and a dielectric constant of 90.
- The 3% NiO in PVDF matrix showed highest shielding effectiveness of 39 dB at 10.3 GHZ.

Abstract

Polyvinylidene difluoride nanocomposites having high dielectric, microwave absorption and electromagnetic interference (EMI) shielding properties has been prepared by loading Nickel oxide (NiO) and NiO embedded graphene hybrid nanostructures into PVDF matrix, and characterized. NiO nanoparticle and NiO/graphene were synthesized from hydrothermal reactions at 80 °C. The nanocomposites are prepared by the solvent casting method of NiO and NiO/graphene hybrid nanomaterials embedded PVDF are evaluated for their thermal, morphological, dielectric, microwave absorption and electromagnetic interference shielding behavior. The TGA results revealed that the thermal permanence of the nanocomposites was improved proportional to the NiO and NiO/graphene content in the PVDF

ACS OMEGA

Sulfonated Poly Ether Sulfone Membrane Reinforced with Bismuth-Based Organic and Inorganic Additives for Fuel Cells

Anie Shejoe Justin Jose Sheela, Siva Moorthy, Berlina Maria Mahimai, Karthikeyan Sekar, Dinakaran Kannaiyan, and Paradesi Deivanayagam*

Karthikeyan Sekar

Department of Chemistry, Faculty of Engine and Technology, SRM Institute of Science ar Technology, Chengalpattu District, Kattanku 603203, Tamilnadu, India

More by Karthikeyan Sekar

Cite this: *ACS Omega* 2023, 8, 30, 27510–27518
Publication Date: July 22, 2023
https://doi.org/10.1021/acsomega.3c03143

SUBJECTS: Composites, Membranes, Metal organic frameworks, Oxides, Polymers

Abstract

ACS OMEGA

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Publication Date: July 22, 2023
https://doi.org/10.1021/acsomega.3c03143

SUBJECTS: Composites, Membranes, Metal organic frameworks, Oxides, Polymers

Abstract

ACS APPLIED POLYMER MATERIALS

PbS Nanoparticles Dispersed in Acid–Base Pair Polymer Nanocomposite Foams for High-Temperature Polymer Electrolyte Membrane Fuel Cell Applications

Kesava Munusamy, Velautham Saravanan, Prabukanthan Peethambaram, Srinivasan Krishnan, and Dinakaran Kannaiyan*

Cite this: *ACS Appl. Polym. Mater.* 2023, 5, 8, 5867–5879
Publication Date: July 8, 2023
https://doi.org/10.1021/acsapm.3c00496

ScienceDirect

International Journal of Hydrogen Energy
Volume 48, Issue 92, 29 November 2023, Pages 36063-36075

Synthesis and fabrication of Cu-trimesic acid MOF anchored sulfonated Poly(2,5-benzimidazole) membranes for PEMFC applications

Siva Moorthy [a], Berlina Maria Mahimai [b], Dinakaran Kannaiyan [c], Paradesi Deivanayagam [b]

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https://doi.org/10.1016/j.ijhydene.2023.05.362
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Highlights

- Cu-MOF loaded sABPBI based composite membrane has been prepared for the first time.
- The developed membrane displayed high conductivity of 0.039Scm^{-1} at 80°C.
- The Cu-TMA/sABPBI composite membrane achieved 62% higher conductivity than the pristine membrane.
- Physicochemical studies revealed a very high water absorption capability (21.6%) and radical stability (89.6%).

Abstract

Porous metal–organic frameworks (MOFs) have started to gain attention because of their high crystallinity, porosity and structural designability, and they can facilitate proton conduction, but the poor membrane forming ability of MOFs limits their application. In this work, composite membranes based on poly (2,5-benzimidazole) (ABPBI) are focused, and the polymer ABPBI was synthesized from its monomer by solution polycondensation method using polyphosphoric acid (PPA) as solvent. Copper-trimesic acid (Cu-TMA) based metal-organic framework (MOF) was prepared by solvothermal synthesis. Varying ratios of MOF were incorporated into the ABPBI polymer matrix to develop a polymer electrolyte membrane (PEM) by solvent casting technique. Sulfonated composites were obtained by immersing the membranes in 20% sulfuric acid and the membranes were used to characterize the crystallographic

Thermal, electrical, morphological and hydrophobic properties of bio-silica reinforced bio-benzoxazine nanocomposites

Original Article Published: 17 April 2023

Volume 13, pages 4193–4205, (2023) Cite this article

Applied Nanoscience

Aims and scope

Submit manuscript

Chandramohan Ayyavu, Parthiban Rangasamy, Ponnusamy Senthil Kumar, Sathishkumar Kannaiyan, Alagar Muthukaruppan & Dinakaran Kannaiyan

Abstract

In this study, we have developed bio-based nanocomposites of polybenzoxazine from bio-benzoxazine resins (C-Fu-BZ and E-Fu-BZ) that are armored with varying weight percentages (1, 3, 5, and 7 wt%) of functionalized silica from cow manure (FCMS). These materials are intended for applications that call for high performance materials. Fourier-transform infrared was used to determine the molecular structure of benzoxazines (FTIR). Eugenol-based matrices and composites had superior heat stability than bio-benzoxazines

Polymers for Advanced Technologies / Volume 34, Issue 10 / p. 3223-3235

RESEARCH ARTICLE

Enhanced microwave absorption properties of magnetite nanoparticles decorated multi walled carbon nanotubes loaded polyaniline/polyvinyl alcohol nanocomposites

Kavitha Narayanasamy, Karikal Chozhan Chinnakkannu, Devansh Sharma, Dinakaran Kannaiyan

First published: 10 July 2023
https://doi.org/10.1002/pat.6132

Abstract

Electromagnetic radiation interference (EMI) or pollution is increased significantly in proportion to the expansion of electronic and communication industries, which lead to the disturbance of the functioning of electronic gadgets and medical equipments, in addition to the human health damage. The Microwave absorbing (MA) composite comprised of polyvinyl alcohol (PVA), polyaniline (PANI), carbon nanotube (MWCNT) and iron oxide (Fe_3O_4) has been developed with various proportions, denoted as PVA/PANI/MWCNT/Fe_3O_4 (1%, 3%, 5%). Fe_3O_4 was prepared using a hydrothermal method, and PVA/PANI/MWCNT/Fe_3O_4 (1%, 3%, 5%) nanocomposites was made by solvent casting techniques. The PVA composite films were also subjected to a range of analyses including IR, TGA, DTA, DTG, SEM, TEM, dielectric measurements and EMI shielding effectiveness (EMI SE), to describe their characteristics. The results of various studies indicate that the PVA/PANI/MWCNT/Fe_3O_4 (1%, 3%, 5%) composites possess enhanced thermal and dielectric characteristics, for instance the PVA/PANI/MWCNT/5% Fe_3O_4 blend nanocomposites possess 10% initial decomposition at 220°C and dielectric constant of 3.2×10^7 at 1 MHz. The total EMI SE value for the synthetic PVA/PANI/MWCNT/Fe_3O_4 was found at 9.2 and 10 GHz is 48 and 54 dB, respectively, exhibiting synergistic properties of the composites toward EMI shielding. The microwave absorption spectra indicate two absorption peaks in the region around 8 to 12 GHz, with the absorption reflection loss (RL) value of −20 dB at 10 GHz for the PVA/PANI/MWCNT/5% Fe_3O_4 nanocomposites.

Thermal, electrical, morphological and hydrophobic properties of bio-silica reinforced bio-benzoxazine nanocomposites

Original Article Published: 17 April 2023

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Polymers for Advanced Technologies / Volume 34, Issue 10 / p. 3223-3235

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Construction of direct Z-scheme g-C_3N_4/$BiYWO_6$ heterojunction photocatalyst with enhanced visible light activity towards the degradation of methylene blue

Research Article Published: 07 September 2022

Volume 30, pages 10179–10190, (2023) Cite this article

Thirugnanam Bavani, Jagannathan Madhavan, Mani Preeyanghaa, Bernaurdshaw Neppolian & Sepperumal Murugesan

Abstract

Construction of the Z-scheme heterojunction photocatalyst achieved highly improved photocatalytic ability by its high redox ability of the photoinduced e^-–h^+ pairs. In the study, Z-scheme g-C_3N_4/$BiYWO_6$ heterojunction photocatalyst is prepared by the single-step hydrothermal method. Further, its photocatalytic ability was assessed by degrading

ScienceDirect

Chemosphere

Volume 313, February 2023, 137552

Construction of direct $FeMoO_4$/g–C_3N_4–2D/2D Z-scheme heterojunction with enhanced photocatalytic treatment of textile wastewater to eliminate the toxic effect in marine environment

Swaminathan Arumugam [a], Thirugnanam Bavani [a], Manickam Selvaraj [b c], Badria M. Al-Shehri [b c d], Mani Preeyanghaa [e], Sieon Jung [f], Jayaraman Theerthagiri [f], Bernaurdshaw Neppolian [g], Sepperumal Murugesan [h], Jagannathan Madhavan [a], Myong Yong Choi [f]

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https://doi.org/10.1016/j.chemosphere.2022.137552

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Highlights

- Novel Z-scheme $FeMoO_4$/g-C_3N_4 heterojunction photocatalysts were constructed.
- Optimal $FeMoO_4$/g-C_3N_4 show excellent degradation of Rhodamine B.
- Optimal $FeMoO_4$/g-C_3N_4 exhibits excellent photostability under visible light.
- h^+ and $O_2^{\bullet -}$ radicals are playing major role in the degradation of RhB.
- Plausible mechanism for direct Z-scheme $FeMoO_4$/g-C_3N_4 heterojunction was proposed.

Abstract

A novel $FeMoO_4$/g-C_3N_4-2D/2D Z-scheme heterojunction photocatalyst was prepared via wet chemical method. The observed structural morphology of $FeMoO_4$/g-C_3N_4 reveals the 2D-iron molybdate ($FeMoO_4$) nanoplates compiled with the 2D-graphitic carbon nitride (g-C_3N_4) nanosheets like structure. The photocatalytic activity of the g-C_3N_4, $FeMoO_4$, and $FeMoO_4$/g-C_3N_4 composites were studied via the degradation of Rhodamine B (RhB) as targeted textile dye under

A Z-scheme $BiYO_3/g-C_3N_4$ heterojunction photocatalyst for the degradation of organic pollutants under visible light irradiation

Research Article Published: 11 January 2023

Volume 30, pages 41095–41106, (2023) Cite this article

Parthasarathy Sasikala, Thirugnanam Bavani, Manickam Selvaraj, Mani Preeyanghaa, Bernaurdshaw Neppolian, Sepperumal Murugesan & Jagannathan Madhavan

Abstract

Photocatalysis is one of the fascinating fields for the wastewater treatment. In this regard, the present study deals with an effective visible light active $BiYO_3/g-C_3N_4$ heterojunction nanocomposite photocatalyst with various ratios of $BiYO_3$ and $g-C_3N_4$ (1:3, 1:1 and 3:1), synthesised by a wet chemical approach. The as-synthesised nanocomposite photocatalysts were investigated via different physicochemical approaches like Fourier transform infrared

A novel S-scheme $Ws_2/BiYWO_6$ electrostatic heterostructure for enhanced photocatalytic degradation performance towards the degradation of Rhodamine B

Research Article Published: 13 December 2022

Volume 30, pages 34468–34480, (2023) Cite this article

Thirugnanam Bavani, Parthasarathy Sasikala, Swaminathan Arumugam, Arumugam Malathi, Piyasan Praserthdam & Jagannathan Madhavan

Abstract

Constructing S-scheme heterojunction between two semiconductor materials is an effective route to increase the photocatalytic degradation efficiency. Here, a novel S-scheme $WS_2/BiYWO_6$ heterojunction photocatalyst was prepared by wet chemical route. At the same time, the photocatalytic degradation performance of the fabricated materials was analyzed

Microwave-assisted synthesis of ZnO nanoparticles using different capping agents and their photocatalytic application

Research Article Published: 06 January 2023

Volume 30, pages 40174–40188, (2023) Cite this article

Environmental Science and Pollution Research

Aims and scope

Submit manuscript

Kumar Mageswari, Peethambaram Prabukanthan & Jagannathan Madhavan

Abstract

This investigation reports the synthesis of ZnO nanoparticles from various sources of zinc salts via a microwave-assisted method. Furthermore, the synthesized ZnO nanoparticles were capped with different capping agents such as sodium hexametaphosphate (SHMP), polyvinylpyrrolidone (PVP), and cetylpyridinium chloride (CPC) to examine the stability and characteristics of ZnO nanoparticles. The synthesized ZnO nanoparticles were characterized with sophisticated analytical techniques such as XRD, FTIR, SEM, UV–vis DRS, Raman, and

Polymers for Advanced Technologies / Volume 34, Issue 7 / p. 2261-2271

RESEARCH ARTICLE

TiO_2-graphene dispersed sulfonated polyphenylenesulfide sulfone nanocomposites for medium temperature PEMFCs

Senthil Theerthagiri, Srinivasan Krishnan, Paradesi Deivanayagam, Chandran Muthiah, Dinakaran Kannaiyan

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Abstract

Sulfonated polyphenylene sulphide sulfone (sPPSS) loaded with titania-graphene (TiO_2-GNS) was synthesized by the polycondensation method and studied their suitability towards proton exchange membrane fuel cell applications. The structural, morphological, and physic-chemical properties of sPPSS nanocomposites containing varying amounts of (1%, 2%, 3%, and 5%) TiO_2-GNS was investigated by Fourier transform infrared, H^1-NMR, P-XRD, FE-SEM, HR-TEM, Raman spectrum, swelling ratio (SR), water uptake, thermal analysis, oxidative stability (OS) and proton conductivity. Further, the obtained TiO_2-GNS dispersed polymer membrane exhibits greatly reduced water absorption 4.44% and a less volume SR (15.6%). The 5 wt% TiO_2-GNS dispersed sPPSS nanocomposites exhibited a PC value around 2.03×10^{-2} S/cm at 110°C. The sPPSS nanocomposites membrane confirmed admirable OS with a maximum degradation of 39.15% during immersed in the Fenton reagent for 6 h at 80°C.

CONFLICT OF INTEREST STATEMENT

The authors declare no conflicts of interest.

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Alexandria Engineering Journal
Volume 72, 1 June 2023, Pages 531-543

Original Article

Synergistic combination of $BiFeO_3$ nanorods and $CeVO_4$ nanoparticles for enhanced visible light driven photocatalytic activity

Velu Venugopal [a], Dhandapani Balaji [b], Mani Preeyanghaa [c], Cheol Joo Moon [d], Bernaurdshaw Neppolian [e], Govarthanan Muthusamy [f g], Jayaraman Theerthagiri [d], Jagannathan Madhavan [a] ✉, Myong Yong Choi [d] ✉

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https://doi.org/10.1016/j.aej.2023.04.024
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Abstract

Eliminating harmful organic pollutants from contaminated water remains an urgent problem to be solved. Taking Rhodamine B (RhB) as a representative organic water pollutant we sought to design a facile and scalable synthesis of a $BiFeO_3/CeVO_4$ (BFO/CVO) nanocomposite catalyst for the degradation of organic pollutant under visible light. BFO nanorods and CVO nanoparticles were fabricated using single-step hydrothermal routes and the resulting materials could be easily combined using a simple wet-chemical precipitation method. From the morphological studies, pure $BiFeO_3$ and $CeVO_4$ revealed the 1D-nanorod and 0D-nanoparticles, respectively. For the BFO/CVO composite, 0D-nanoparticles were well attached on the 1D-nanorods of $BiFeO_3$. Also, the 10% BFO/CVO composite provided efficient photodegradation efficiency (92%) of RhB with 0.0225 min^{-1} rate constant. Furthermore, the obtained photocatalyst had a low band gap energy value (2.01 eV) and photoluminescence intensity when compared to pure BFO and CVO under visible light illumination. The radical scavenging experiments proposed that the $^{\bullet}OH$ acted a substantial role in the RhB decomposition pathway. The optimized BFO/CVO composite photocatalyst exhibits superior recyclability and photostability. The superior photocatalytic action of the 10% BFO/CVO composite could be explained by the development of a heterojunction among BFO and CVO where electrons can migrate at the BFO/CVO interface. These results imply that $BiFeO_3/CeVO_4$ composites are suitable photocatalysts for the elimination of organic toxins from water.

Previous Next

Keywords

PbS Nanoparticles Dispersed in Acid–Base Pair Polymer Nanocomposite Foams for High-Temperature Polymer Electrolyte Membrane Fuel Cell Applications

Kesava Munusamy, Velautham Saravanan, Prabukanthan Peethambaram, Srinivasan Krishnan, and Dinakaran Kannaiyan*

Cite this: *ACS Appl. Polym. Mater.* 2023, 5, 8, 5867–5879
Publication Date: July 8, 2023
https://doi.org/10.1021/acsapm.3c00496

SUBJECTS: Foams, Fuel cells, Membranes, Nanocomposites, Polymers

Abstract

Enhanced dielectric properties of graphene and conjugated terpolymer-blended polyvinylidene difluoride

Published: 07 June 2023

Volume 46, article number 118, (2023) Cite this article

Bulletin of Materials Science

Aims and scope

Submit manuscript

Narayanasamy Kavitha, Ayyavu Chandramohan, Krishnan Srinivasan, Peethambaram Prabukanthan & Kannaiyan Dinakaran

Abstract

In this study, electrically conductive composites of ethylenedioxythiophene-based terpolymer (PETCH), polyvinylidene difluoride (PVDF) and graphene nanosheets (GNS) have been prepared by compression molding and characterized. A new conjugated PETCH polymer was synthesized and its chemical structure has been confirmed by Fourier transform infrared and 1H-NMR spectroscopy. The varying weight percentages of (1, 3 and 5%) GNS and 10 wt% PETCH dispersed PVDF nanocomposites were prepared and