



Photoenhanced degradation of methylene blue on polyaniline engineered multiferroics ($\text{BiAl}_{0.3}\text{Mn}_{0.3}\text{Fe}_{0.4}\text{O}_3$) nanocomposite systems: a comprehensive study

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ABSTRACT

This study encompasses the synthesis of polyaniline (PANI) composites with different contents of $\text{BiAl}_{0.3}\text{Mn}_{0.3}\text{Fe}_{0.4}\text{O}_3$ (12.5%, 25%, 37.5% and 50% w/w) nanoparticles (NPs). The surface morphologies and crystallite structures of these composites were characterized by X-ray diffraction spectroscopy, UV/Visible spectroscopy, Fourier transform infrared spectroscopy and scanning electron microscopy. The composites were successfully applied for the photodegradation of methylene blue in aqueous media and various parameters were investigated, such as effect of reaction time, amount of PANI-NPs and degradation kinetic studies. The optical studies were performed by UV/Visible spectroscopy. It was critically observed that the degradation of methylene blue followed the first-order kinetics. The NPs amount present in the composite also showed a remarkable influence on the degradation efficiency which increased with the increase in BiAlMn substituted multiferroic contents.

Keywords: Multiferroics; Polyaniline; Nanocomposite; Photodegradation; Methylene blue

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