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Aqueous Phase Exfoliation and *In-Situ* Decoration of Graphene with Nanoparticles for Photocatalysis †

Tejwant Singh Kang [1]

[1] Department of Chemistry, UGC-Centre for Advance Studies – II, Guru Nanak Dev University, Amritsar, 143005, India;
* Correspondence: tejwant.chem@gndu.ac.in (T.S.K.);
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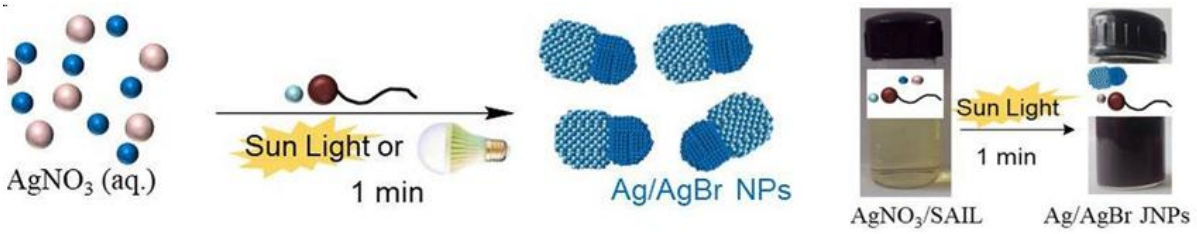
Abstract: The advent of ionic liquids (ILs), the ionic compounds that are liquid at least below 100 °C, having unique physicochemical properties, have exerted a great impact on research and development in different scientific avenues during the last two decades [1]. The control over the properties of ILs, via altering the nature of cation, anion, length or nature of alkyl chain, etc., have further widened the application arena of ILs [1]. Many of the ILs have shown better surface-active properties as compared to conventional ionic surfactants [2]. Further, the ILs having a metal atom or metal ion in one of the constituent ions of IL are classified as Metal-based ILs (MILs). Inspired by the surface-active nature of SAILs and the utilization of MILs to prepare a variety of nanomaterials, our group conceived to synthesize surface-active MILs for liquid-phase exfoliation of graphene and *in-situ* preparation of different nanomaterials in a sustainable manner for photocatalytic applications. The prepared nanocomposites (ZnS@G; α-Fe_2O_3@G and Ag/AgBr@G) have shown enhanced photocatalytic efficiency towards the degradation of toxic effluents in waste-water as compared to respective nanomaterials (ZnS, α-Fe_2O_3 and Ag/AgBr) under sunlight or visible light [3-7]. Not only this, we have successfully immobilized Cellulase on exfoliated G, which showed a 13-fold enhancement in catalytic efficiency compared to that observed in buffer only.



Keywords: Ag/AgBr NPs; ionic liquids; photocatalysis.

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Conflicts of Interest

The authors declare no conflict of interest.

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