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EDITORIAL

# Preface

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As the frontiers of technology evolve, advanced materials and their characterization and the correlation to important physical properties along with ultimate performance have garnered increasingly focused attention. Recently, environmentally benign materials for sustainable lifestyle is attracting significant attention in recent times. The current first issue of *Emergent Materials* mainly focuses on materials that have utmost importance in both industry and technology from the materials perspective. These include materials for purification for drinking water, polymer-based light controllable sensors, paraffin wax-based thermal conductors, specific metal ions adsorbers, piezoelectric energy harvesters, conjugated polymers for thermoelectrics, anticorrosive materials, elements for hardness removal from water and mechanically strong polymer composites. This issue contains 10 papers contributed from outstanding research groups that cover diverse areas of chemistry of materials and describe their preparatory methods, protocols, and applications in detail.

In light of the serious environmental issues connected to corrosion, Aboubakr Abdullah and co-workers present an excellent review summarizing the recent advances in electroless-plated Ni/P and its composites for both erosion and corrosion. They especially emphasize the mechanisms of electroless NiP and their nanocomposite coatings by substantiating the necessity of new products towards future development. Since water is always a keen area of research interest, particular significance is given to this topic in this issue. While Samer Adham and co-workers discuss their investigations on new ion exchange resins for hardness removal from boiler feedwater, Mariappan Rajan and co-workers has elaborately discussed metal oxide nanocomposites as attractive pollution adsorbents of drinking water. In the former paper, the authors claim that their new resins result in lowering operating costs either because of higher capacity, reduced chemical consumption during regeneration or improved physical properties. For the pollutant-absorbing case, highly efficient magnesium oxide ($MgO_2$)-entrapped polypyrrole (Ppy) nanocomposite adsorbents remove toxic fluoride pollutants from drinking water. Similarly, the research group of Keloth Basavaiah reports efficient and selective adsorption of organic dye (crystal violet) pollutants from contaminated water by magnetite nanoparticles.

Another hazardous pollutant affecting the environmental balance is the lead(II) ions, and the removal of which by activated carbon nanofibers (ACNFs) obtained from polyacrylonitrile (PAN) precursor is the topic of investigation by Norhaniza Yusof et al. The authors prove that the Pb(II) removal by both ACNFs and its composite with $MnO_2$ is higher when compared to the commercial granular activated carbon. The research group of AlMaadeed et al. reports the fabrication of a flexible piezoelectric device based on quaternary phasic poly(vinylidene fluoride-co-hexa-fluoropropylene) nanocomposite containing graphene-titania ceramic filler. They propose designing the nanocomposite films in fabricating energy-harvesting devices applicable in flexible and wearable electronics.

Polymers are widely used to generate many useful materials for light-controlled sensors and thermoelectric applications. The development of a typical light controllable bioadhesive from photolabile carboxybetaine ester-based polymer is another topic of interest in this issue. Peter Kasak and co-workers propose the possible biomedical applications of such materials for spatially controlled drug release or laparoscopic utilization. Igor Krupa et al. report the application of a foamy phase-change material based on linear low-density polyethylene-blended paraffin wax for thermal insulators. In addition, the effect of pollen fillers for strengthening the epoxy composites and the thermoelectric properties of ferric salt-doped two-dimensional (2D) conjugated polymer are the topic of discussion for the respective reports by Carson Meredith et al. and Xiong Gong et al.

In each of the papers, the viewpoint taken is unusual, and our sincere thanks to all the reviewers and editors for their precious time and help in bringing this highly informative and competitive issue to fruition. We strongly believe that this issue will help the multidisciplinary community to identify a key direction for the science and technology towards advanced emergent materials.

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