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Development of advanced hybrid geopolymeric substrate materials for removal of phenol from aqueous solutions

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Abstract

Conventionally the activated carbon prepared using synthetic activated charcoal and agricultural waste has been used as adsorbent for removal of phenol. However the removal efficiency of these materials is limited. To improve the removal efficiency, there is an urgent need to develop novel substrate materials capable of exerting synergistic action of organic and inorganic hybrid materials. The unique characteristics of Geopolymeric materials are attracting attentions of materials scientist all over the world for further extending its application spectrum. Geopolymeric materials are basically inorganic polymeric materials. Recently the authors have developed a novel process for making advanced hybrid geopolymeric materials using industrial and agricultural waste namely fly ash and rice husk as a resource materials for obtaining precursor for organic and inorganic species and filed a patent application for the same in India and USA.

In the present research work the developed novel hybrid geopolymeric material have been studies for its potential for the removal of phenol from aqueous solutions. The novel hybrid materials contain inorganic and organic moieties having varieties of functional linkages capable of sorption of Phenol molecules. The novel hybrid material based substrate material has been characterized by Infra red spectroscopy and the phenol removal efficiency has been evaluated using UV-Visible spectrophotometer. Removal efficiency up to 90% has been achieved using the novels substrates materials. The results of these studies are presenting in this paper.