**Removal of heavy metal ion As(III) from aqueous solution by MgO/MnO2 Nanocomposites**

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Water pollution and more especially heavy metals pollution control, has attracted considerable attention and still remains a serious perennial problem [1, 2]. Because they have high toxicity, stability in water media and posing a serious threat to human health and ecological systems [3]. Arsenic contamination in natural water is a worldwide problems reported in the USA, China, Chile, Bangladesh, Mexico, Argentina, Poland, Canada, Hungary, New Zealand, Japan, Vietnam, and India. Thus, the removal of such toxic metal ions from wastewater is a vital issue. The World Health Organization (WHO) suggested that the maximum contaminant level (MCL) for arsenic in drinking water should not exceed of 0.01 mg.L-1 [5].

Indeed, nanoparticles of metal oxides able to adsorb and remove metals in trace concentrations with high capacity due to their unsaturated atoms on the surface of NPs to bind other atoms, molecules and ions. In fact, causes quick adsorption process in the simple operation path [1]. Several treatment techniques and processes, such as, chemical precipitation, ion exchange, nanofiltration, low energy reverse osmosis [6], membrane processes [7], and adsorption [8], have been developed for the removal of heavy metals from the contaminated water. Adsorption technology has widely accepted because, this method is effective, simple and economic [4]. A wide variation in adsorption capacity of As(III) removal are reported for ZrO2/Fe2O3 [9], Fe2O3 [6], TiO2.xH2O [10] and CuO [11] nanoparticles in range of 120, 95.5, 83 and 5.7 mg.g−1, respectively. These adsorption capacities still are low. On the base of isolable analogy, appropriate nanocomposites could improve the adsorption properties comparing to single nanoparticles.

So, in order of find high capacity and cheap reagent for heavy metal removing, several kind nanomaterials were studied. (MgO)xMnO2 nanocomposits and MgO, MnO2 nanoparticles using sonochemical method were prepared and, characterized by Ft-IR, AAS, UV-Vis spectroscopies and SEM imaging. Finally, their efficiency in removing of arsenic, mercury and lead ions from water were evaluated.

The present study shows that MgO/MnO2 nanocomposites play as an efficient adsorbent for As(III) removal from aqueous media at neutral pH. The highest removal capacity for removal of As(III) was reached to 99.99% removal percentage and 0.1 ppb sensitivity that obtained for (MgO)0.32CuO nanocomposite and is are much lower than the WHO allowable limits.

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