

## **Adsorption of multi-contaminant on modified montmorillonite**

LINGYA MA, JIANXI ZHU, RUNLIANG ZHU, XIAOLIANG LIANG, HONGPING HE,

<sup>1</sup> Guangzhou Institute of Geochemistry, Guangzhou 510640, China (hehp@gig.ac.cn)

Inorganic-organic montmorillonites (IOMts), intercalated by both surfactant and hydroxyl-metal, have been widely used to remove both organic and inorganic contaminants from aqueous solution. In the environment, organic contaminants, phosphate and heavy metal cations often coexist in soil and wastewater, thus their transport and fate may be significantly influenced by mutual effects among them. Therefore, the adsorption behavior of organic contaminants, phosphate, and heavy metal cations on IOMts is worth studying. In this study, IOMts obtained by intercalating hydroxy-aluminum ( $Al_{13}$ ) with the cationic surfactant (C16) and zwitterionic surfactant (Z16) were investigated with the aim to remove phenol, phosphate and  $Cd^{2+}$  simultaneously. IOMts could efficiently remove phenol and phosphate, but not  $Cd^{2+}$  in the single adsorption system. However, all three contaminants could be efficiently removed simultaneously in the multi-contaminant adsorption system. The adsorptions of phenol on IOMts were not affected by the other two inorganic components and vice versa. The adsorptions of phosphate and  $Cd^{2+}$  were significantly enhanced in the multi-contaminant adsorption system, and their adsorption amounts were synergistically increased. The enhancements of adsorption of phosphate and  $Cd^{2+}$  on the IOMts were also increased with the increase of  $Al_{13}$  content. The possible adsorption mechanism for phosphate and  $Cd^{2+}$  in the multi-contaminant system may involve the formation of phosphate-bridged ternary complexes. The findings have implications on developing new effective IOMt adsorbents toward multi-contaminant, and understanding the transport and fate of contaminants.