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## Investigation of thermodynamic and kinetic behaviors of marine sediment at sorption of phthalate esters

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Phthalate esters (PEs) are important classes of chemical endocrine-disrupting compounds. PEs is mainly used as plasticizers. These compounds are easily released into the environment because there is no covalent bond between the phthalates and plastics in which they are mixed. In this study the effect of environmental parameters such as time contact, temperature and salinity on adsorption process of 6 PEs on the sediments of the north-west of Persian Gulf was investigated. Also, the adsorption isotherms and kinetic parameters have been studied. The results showed that the adsorption of PEs is very fast and reach the equilibrium within 6 hours and after this duration only a small change was observed. Among the various PEs, di-normyl puthyl phthalate ester (DOP) showed the most adsorption tendency to the studied sediments with average value 613.65  $\mu\text{g. g}^{-1}$ . Several kinetic models have been investigated; pseudo-second order equation was best fitted to the adsorption behavior of PEs with marine sediments at different contact times and film diffusion is the rate limiting step. The sorption equilibrium results could be well described by linear isotherm. This means that in PEs sorption process on marine sediments partition domain is dominated over the whole filling domain. After  $\text{H}_2\text{O}_2$  oxidation of sediments, the  $K_d$  values were reduced by average 64.82%. It means that amorphous organic carbon fraction involve the major part of total organic carbon in sediments. PEs sorption isotherms on treated sediments follow the nonlinear models. By increasing the temperature, the adsorption of PEs on sediments was decreased indicating that the process is exothermic. It was also in thermodynamic study  $\Delta H^0 < 0$ . The mines value of  $\Delta G^0$  for these compounds showed the spontaneous sorption process for them. It be noted that mechanism was carried out with decreasing in entropy. These research findings have a prime importance on assessment of the fate and transport PEs in seawater-sediment systems.

### Biography

Somaye Mohammadian is working in a microalgae production company and she is a PhD student in analytical chemistry from Tabriz University. She completed her master degree in marine chemistry from Khorramshar marine science and technology. She has a paper with title of "Investigation of thermodynamic and kinetic behavior sorption of phthalate esters on marine sediment" that is inpress.

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