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TITLE: Arsenic, cadmium, nickel and lead adsorption mechanism, kinetics and thermodynamics of copper based and iron based metal organic framework
AUTHORS (FIRST NAME, LAST NAME): Aysu Yurdusen[2], Yuda Yurum[1]
INSTITUTIONS (ALL):
1. Fac Eng and Nat Sciences, Tuzla, Turkey.
2. Materials Science and Nanoengineering, Sabanci University, Istanbul, Turkey.
ABSTRACT BODY:
Abstract: From the day negative impacts of heavy metals on human health and ecosystem have been recognized on, removal of heavy metals is a crucial environmental concern that immediate action has to be taken towards. With this study, we are suggesting novel adsorbents with high adsorption capacity to lower the residual heavy metal concentrations below maximum permitted levels. In line with our purpose, copper based and iron based metal organic frameworks, which have high surface area (up to BET surface area of 1500 m^2/g) compared to other commercial and commonly used adsorbents, are synthesized. Removal of arsenic, cadmium, nickel and lead by these novel materials are figured out and their heavy metal adsorption capacities and mechanisms are investigated. Additionally, adsorption kinetics, mechanism and thermodynamic properties for heavy metal adsorption on copper based and iron based metal organic frameworks are determined and compared with each other. Nevertheless, transfer of copper and iron ions to the solution is examined to prove the reliability of our metal organic frameworks. Metal organic frameworks synthesized are characterized by X-ray diffractometer (XRD), Fourier transform infrared spectroscopy (FTIR), scanning electron microscopy (SEM), Brunauer–Emmett–Teller (BET) method and thermogravimetric analysis (TGA) and heavy metal concentrations are measured with simultaneous inductively coupled plasma ICP- OES spectrophotometer. With this study, we are suggesting novel, promising and effective adsorbents that has not been used for heavy metal adsorption studies and figured out that these novel materials that have never been used before for heavy metal removal are able to decrease the effluent heavy metal concentrations below maximum allowable residual heavy metal levels. Moreover, we are broadening the application field of our novel materials by using them for heavy metal adsorption studies and showing that these novel nanomaterials are able to decrease the effluent heavy metal concentrations below maximum permitted levels.
(No Image Selected)