Quantification of Pyrolysis-induced heterogeneity in Biomass-derived Sorbents and its effect on Metal Sorption

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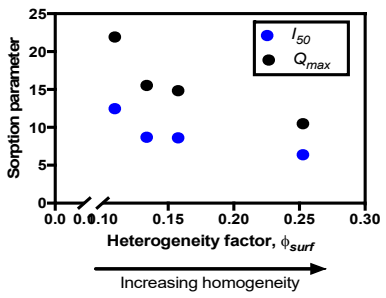
Environmental behavior of pyrogenic organic matter is known to be dictated by fire-induced variability in surface and bulk properties. However, much of this variability/heterogeneity has only been described qualitatively. This poster presentation will explore heterogeneity in charcoals from a quantitative perspective through a "surface heterogeneity factor (ϕ_{surf})" approach[1] and links to metal sorption characteristics. Specifically, the presentation will cover variations in charcoal ϕ_{surf} and its relationship to key metal sorption characteristics e.g. sorption maximum (Q_{max}), point of 50% sorption (I_{50}) and the extent of adsorption window (W_{ads}).



Results from Pb^{2+} sorption at pH 5 to charcoals showed that both Q_{max} and I_{50} decreased with increasing ϕ_{surf} (i.e. decreasing heterogeneity) indicating heterogeneous surfaces had both a wider diversity and larger quantity of sites for Pb^{2+} sorption than more homogeneous (larger ϕ_{surf}) surfaces. W_{ads} also increased with decreasing ϕ_{surf} , reflecting that pyrolysis-induced heterogeneity broadens the range of concentrations over which Pb^{2+} can be sorbed to the charcoals. The presentation will further discuss these (and other) results, methodology and modeling applications.

(1) Harvey, Leonce & Herbert (2018), *Environmental Science & Technology 52*(11), 6167-6176.