The influence of solid phase organic carbon on the sorption/desorption of hydrophobic organic pollutants in landfill barriers

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Hydrophobic organic contaminants (HOCs) driven to sedimentary organic matter (SOM) in sediments by the major repulsive force that repels anthropogenic HOCs from groundwater onto SOM surface are hydrophobic strength that closely related to the characteristics of SOM and HOCs. The distribution and transportation of HOCs can be predicted as a function of SOM. The Oxford Clay(OxC), the Kimmeridge Clay(KC), and Tertiary mud(WF) were used because of their distinctive OM characteristics (AOM (Amorphous Organic Matter) rich and/or phytoclast rich). SOM was isolated for identification and analysis using heavy liquid extraction and HF digestion. These organic materials were used to determine influences of extraction on HOCs (toluene and naphthalene) sorption and desorption. Organic petrology classification was applied to identify the various types of isolated OM(Fig.1). AOM rich sorbent extracts demonstrated a higher absorption capacity than the phytoclasts rich sorbents. However, the phytoclast rich sorbent showed a higher sorption/desorption hysteresis capacity for toluene than AOM. The sorption and desorption hysteresis also influence the HOCs fate in sediments/clays. Implications of results in landfill design/risk assessment and modelling are discussed.

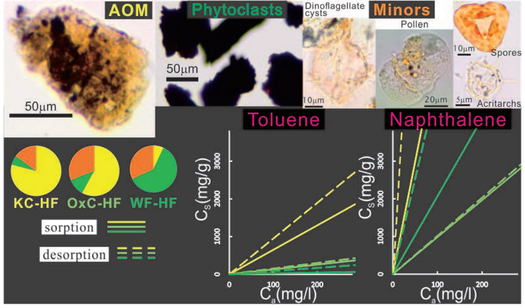

Figure 1: SOM types and HOCs sorption and desorption isotherms on the HF extracted OM from KC, OxC and WF.