

## **Characterization of distribution and associations of typical organic compounds in soils using synchrotron radiation based microspectroscopies**

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Sorption of nonionic organic compounds (NOCs) to soils has been the focus of numerous studies with conventional batch experiments. Knowledge on role of organic carbon moieties as the sorptive domains for nonionic organic compounds in soils still remains unclear due to the limits of analytical techniques and complex soil matrices. Meanwhile, direct evidence based on in-situ analytical techniques operated at the fine scale for the binding sites and the adsorbed species of NOCs in soils is lacking. In this report, we identified the speciation and mapped and distribution of two organobromine compounds (i.e. decabromodiphenyl ether, BDE-209 and tetrabromobisphenol A, TBBPA) and four nitroaromatic compound with varying hydrophobicity (i.e. 1,3-dinitrobenzene, 1,5-dinitronaphthalene, 3-nitrophenanthrene and 6-nitrobenzo[a]pyrene) in soils with different properties on a 6~10  $\mu\text{m}$  scale spatial resolution using synchrotron based Fourier transform infrared (FTIR) and microbeam X-ray fluorescence ( $\mu\text{-XRF}$ ) microspectroscopies. This work is the first in-situ investigation on the microdistribution of NOCs and their associations with organic carbon species in natural soils. The combination of FTIR and  $\mu\text{-XRF}$  microspectroscopies allows to in-situ reveal the speciation and distribution of some typical compounds and their associated environmental processes in the soil environments, facilitating to understand the relevant reaction mechanisms.