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Microporous organic polymer for sample preparation in trace analysis of complicated samples

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Microporous Organic Polymers (MOPs) are generated by linkages of organic polymerizable monomer building blocks, providing high permanent porosity and excellent stability. Herein, we reported the first example of the application of Organic Building Block based MOPs (OBB-MOPs) as efficient enrichment media for sample preparation. A novel multilayer inter-bridging strategy was proposed to fabricate OBB-MOP coatings on silica substrate with well-controlled thickness. Strong covalent bonds throughout the network and interlayer bridging improved the durability of the coating significantly. Outstanding chemical stability was observed. SNW-1 coating possessed micro porous network structure constructed by conjugated and nitrogen-rich building blocks. Thus, the coating exhibited a superior enrichment performance of polycyclic aromatic hydrocarbons and Volatile Fatty Acids (VFAs) over commercial coatings based on interactions including π-π affinity and acid-base interaction. This coating was combined with gas chromatography/mass spectrometry for the non-invasive analysis of VFAs from tea leaf and tobacco shred samples. The low detection limits of 0.014-0.026 μg/L were achieved with the RSDs between 4.3-9.0%. Good recoveries of the samples were obtained in the range of 90-129% and 77-118% with the corresponding RSDs of 2.6-9.3% and 1.9-10%, respectively.

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