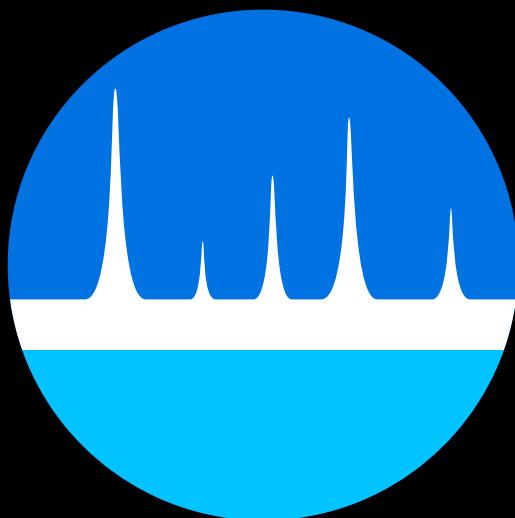


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*BOOK OF ABSTRACTS***

GRAPHENE-BASED HYBRID SORBENTS IN SAMPLE PREPARATION: 1. SYNTHESIS AND CHARACTERIZATION

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In the last decades, graphene-derived sorbents have been widely applied in sample preparation techniques, mainly due to their characteristics such as high surface area, delocalized π electrons, and single-layer structure. The Hummers method (1958), with slight modifications, has been used to obtain graphene oxide (GO) from graphite. Graphite powder is oxidized using H_2SO_4 , NaNO_3 , KMnO_4 , and H_2O_2 , and graphite oxide undergoes physical exfoliation through ultrasonication to provide GO. After obtaining GO, it can be anchored onto silica for use in dispersive or packed sample preparation techniques, without stacking of graphene sheets, thereby avoiding clogging. For this purpose, GO is treated with 1-ethyl-3-(3-dimethylaminopropyl) carbodiimide hydrochloride (EDC) and N-hydroxysuccinimide (NHS) in aqueous solution, and then anchored onto aminopropyl silica. In addition, the surface of the nanomaterial can be functionalized with several compounds, including octadecylsilane (C18), ionic liquids (ILs), and polysaccharides such as chitosan (CS) and β -cyclodextrin (β -CD). For C18 functionalization, SiGO is refluxed under an inert atmosphere with toluene, imidazole, and chlorodimethyl-n-octadecylsilane (ODS). Endcapping of this material is carried out using trimethylchlorosilane (TMS). For functionalization with ionic liquids, the modification of the oxygenated groups of GO with thiol groups is required. For this, 3-mercaptopropyltrimethoxysilane (MPTMS) is used under N_2 atmosphere, followed by heating under alkaline conditions. The ionic liquids themselves are prepared separately by mixing imidazoles with alkyl halides or sultones. The functionalization of GO is then performed under an inert atmosphere in the presence of 2,2'-azobis(2-methylpropionitrile) (AIBN). For the synthesis of biosorbents, CS is heated together with SiGO in an acetic acid solution in the presence of the crosslinker glutaraldehyde. For functionalization with β -CD, (3-aminopropyl)triethoxysilane (APTES) was used in DMF to couple the polysaccharide to the GOSi. The synthesized sorbent materials are characterized by several techniques, including Scanning Electron Microscopy (SEM), Fourier Transform Infrared Spectroscopy (FT-IR), and Thermogravimetric Analysis (TGA).

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