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Development of an efficient capture resin for sphingolipids by using a chemoselective reaction and a stereochemical analysis method

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Sphingolipids comprise a complex range of lipids in which fatty acids are linked via amide bonds to a long-chain base or sphingoid-base backbone. Sphingolipids exist mostly in membranes and involved in a number of cell signaling systems. Sphingosines are a related class of long chain aliphatic compounds possessing two chiral centers which produce four stereoisomers and they are the backbone of more complex sphingolipids, including ceramide, sphingomyelin, cerebrosides and glycosphingolipids. These compounds are expressed on the surface of cell membranes and play an important role in cell-cell interactions, in signal transduction and in anchoring of proteins and also sphingosines are the inhibitors of protein kinase C. Due to their stereochemical interest and biological importance, the analysis methods for sphingosine and sphingolipids are therefore extremely important in drug discovery and as well is in life science. However conventional extraction methods of sphingolipids have been complicated with multistep protocols and no efficient stereochemical analysis method for biological samples has been established. Herein, we presenting an efficient extraction methodology by introducing a new concept called selective capture with catch and release process by chemoselective reaction utilizing glutaraldehyde resin and stereochemical analysis method using chiral HPLC technique.

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Thermal and mechanical properties of porous ceramics

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Production of porous silica-alumina refractory insulating firebricks from mixtures of silica sand and recycled alumina was investigated. Expanded perlite and saw-dust were added to create the pores. Adding of expanded perlite gives more mechanically stronger refractory (FS:36.7 MPa) but less porosity (p:35.8%) compared to the refractory containing sawdust (FS:29.7 MPa; p:45.8%). The latters are characterized by their lower thermal conductivities (0.53 W/mK). Ultrasonic pulse velocity testing was used for non-destructive quantification of thermal shock damage in refractory samples. The formation of cracks decreases the velocity of ultrasonic pulses travelling in the refractory because it depends on the density and elastic properties of the material. The thermal shock resistance shows the ability of the samples to withstand rapid changes in temperature. Various properties, such as nitrogen adsorption and surface area were also examined.

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