UNUSUAL ADSORBENTS FOR SUPERCRITICAL FLUID CHROMATOGRAPHY

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Highly effective, specific drugs are often chiral compounds with one or more chiral centers. Since new pharmaceutical products should contain only the active enantiomer, non-active or even contradictory effective enantiomers are considered as contamination of the product. Adsorptive separation processes using supercritical fluids are gaining increasing importance, with particle diameters reaching into the nanoscale. The development of a selective separation process for the active enantiomer includes the selection and modification of suitable carrier materials and their adaptation to the specific requirements for adsorption and separation. Nanoscale Hollow Spheres with modified surface properties produced by emulsion synthesis [1] offer a high potential for pharmaceutical applications either as drug carriers or for stereoselective, adsorptive separation of chiral drugs. If it is possible to bind the target enantiomer to the particles, separation and drug deposition can be accomplished in just one process step [2].

To design such separation processes it is essential to have a tool to quantify the adsorption of the enantiomers of interest to the particles with varying pressure and temperature. A chromatographic method for measuring adsorption equilibria with supercritical CO_2 by Frontal Analysis Chromatography with or without organic modifiers has been developed [3]. Furthermore, the use of smallest particles for SFC applications has been investigated. As development of stationary phases for chromatography is focused on HPLC, particle size is limited by the pressure drop in a HPLC-System. The low viscosity of supercritical CO_2 however, results in lower pressure drops and so allows for smaller particles.

References:

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