Hamburg University of Technology (TUHH)
Institute of Thermal Separation Processes -V8-
Eissendorfer Str. 38, DE-21073 Hamburg

Please fill out the form with the corresponding data for your abstract and send it to: aerogelconference@tuhh.de

In the E-mail you may include other files (e.g. Word, PDF or images).

Abstract Formulary

Presentation type: **Oral** ✔ **Poster** ☐

Title: The adsorptive removal of antibiotics and various oil/organic solvents from aqueous solutions by VTMS derived silica aerogels

Authors: Selay Sert Çok, Fatoş Koç, Nilay Gizli

Presenting author: Selay Sert Çok

Institution (Presenter): Ege University, Chemical Engineering Department

ABSTRACT (Space limited to 2200 characters)

In this study, an organically modified silica aerogel was synthesized by following a facile sol-gel method under ambient pressure. A silica precursor containing non-polar and non-hydrolyzable vinyl group (vinyltrimethoxysilane, VTMS) was used in the synthesis. Without requiring additional modification steps, the aerogel-like hydrophobic material was synthesized only within two days. Due to the steric repulsion of the radical polar groups during APD, the pore collapse was prevented, and the structural integrity was preserved. All samples exhibited a high degree of hydrophobicity (θ=142°) and low density (ρ=0.105 g/cm^3). Owing to these properties, it seemed that they were the perfect candidates to be used as adsorbents for oil/organic solvent removal applications. Therefore, in the study, monolithic and hydrophobic samples were utilized as sorbents in batch sorption experiments for oil/organic solvent removal. The others were grounded into powder form and they were subjected to a heat treatment at 500°C, which turned their nature from hydrophobic to hydrophilic, to investigate their adsorptive behavior of these samples on the antibiotic removal from aqueous solution. As an emerging pollutant, fluoroquinolone-type antibiotic ciprofloxacin was selected as a reference in the adsorption experiments. Results have shown that both hydrophobic and hydrophilic aerogels have exhibited fast sorption kinetics and high adsorption capacity. The maximum adsorption capacity for hydrophobic aerogels in kerosene removal was recorded as 11 g/g, whereas it was recorded as 52 mg/g for the removal of ciprofloxacin via hydrophilic aerogels. The obtained capacities were endurable up to 10 cycles for oil removal and 6 for antibiotic removal. These promising results indicate that vinyl-modified aerogels can be regarded as potential adsorbents for various pollutants in environmental remediation applications.