

Extraction of Hydrophobic Compounds from Solid Matrixes Using Subcritical Water

E.M. Oreno¹, J. Reza^{C, S, 2} and A. Trejo¹

¹*Instituto Mexicano del Petróleo, Programa de Ingeniería Molecular, Área de Investigación en Termofísica.
Eje Lázaro Cárdenas, México D.F., Mexico*

²*Programa de Ingeniería Molecular, Área de Investigación en Termofísica, Instituto Mexicano del Petróleo,
México, D.F., Mexico
jreza@imp.mx*

Subcritical water (pressurized hot water) at a temperature of 250 °C and pressures ranging from (3.88 to 6.91) MPa was employed to extract hydrophobic organic compounds from solid matrixes. The studied hydrophobic organic compounds were two polycyclic aromatic hydrocarbons (PAHs): anthracene and 9,10-dihydroanthracene adsorbed on silicon dioxide and on a sample of soil. The PAHs were extracted from the solid matrixes both as pure components and as binary mixtures of known concentration. The mass of subcritical water that was used in the extraction experiments ranged from (18.5 to 25.5) g. The fortification levels of the two studied PAHs ranged from (4.7×10^{-6} to 3.1×10^{-3}) g PAH/g solid. Reversed phase high performance liquid chromatography, with dual detection (UV and florescence), was used to determine the amount of PAHs that remained adsorbed on the solid matrix after the extraction experiments.

Under the above experimental conditions, the average recoveries of the studied PAHs, as single compounds, was of 100.0 % with an uncertainty of 1.2 %. The average recovery of the PAHs from the binary mixtures, ranged from (97.8 to 100.0) %, with an average uncertainty of 2.3 %.