Alexander Samokhvalov[1], *Zenda Davis*[1] *and Bruce Tatarchuk*[2], (1)Center for Microfibrous Materials Manufacturing, Department of Chemical Engineering, Auburn University, 212 Ross Hall, Auburn, AL 36849, (2)Chemical Engineering, Auburn University, 230 Ross Hall, Auburn, AL 36849

Interactions Of Sulfur-Containing Polyaromatic Hydrocarbons S-PAHs With Surface Of Titania -Supported Silver: Novel Model System For Studies Of Adsorption/Desorption and Surface Reactivity Of Adsorbents For Sulfur Removal

The adsorption of chemical compounds from the structural row of Sulfur-Containing Polyaromatic Hydrocarbons (S-PAHs), including thiophene (T), benzothiophene (BT) and dibenzothiophene (DBT) on surface of polycrystalline metallic silver supported on thermally-grown titania was studied. Molecular films of silver nitrate precursor were deposited onto thin films of titania, that were thermally grown on titanium metal foils, with subsequent calcination to form titania-supported metal silver. The amount of the deposited silver was determined by the gravimetric-based calibration technique. Surface morphology and spatial dispersion of the titania-supported silver was studied by SEM in the energy dispersive X-Ray emission mode (SEM-EDX) and by X-Ray Diffraction (XRD). Chemical composition of the supported Ag specimens was determined by X-Ray Photoemission Spectroscopy (XPS). The subsequent adsorption of selected S-PAHs onto the supported silver films was carried out from their solutions in toluene/octane that represent chemical composition of real sulfur-containing liquid fuels. Adsorption of S-PAHs was performed ex-situ under controlled atmosphere conditions by the novel modification of spray deposition technique. Nature of binding site and chemical interactions of S-moieties of S-PAHs with surface of supported silver were studied by Temperature-Programmed Desorption (TPD) and Temperature-Programmed Reaction Spectroscopy (TPRS) under High Vacuum (HV) conditions. Desorption temperature and thermally-induced decomposition pathways of the adsorbed molecules depend on the molecular structure of S-PAHs.