

Inorganic Radiochemistry Of Heavy Elements

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Experimental developments in inorganic gas phase radiochemistry: Early gas solid chromatography studies.- Techniques for isolation of short-lived accelerator produced activities.- First laboratory simulation.- Experiments with s.f. nuclides on a heavy ion cyclotron.- Techniques for alpha-active nuclides with corrosive reagents.- Sample experiments.- Relative merit of the techniques based on IC and TC.- Recent techniques for alpha-active nuclides in non corrosive environment.- Hassium tetroxide thermochromatography.- Chemical identification of metallic element 112.- Future of radiochemistry studies of heavy metals.- Prospective classes of compounds.- Prospects for related groups of elements.- Separations in applied radiochemistry practice.- - Physicochemical Fundamentals: Molecular kinetics.- Concentration and speed of gaseous molecules.- Number of collisions of molecules with the walls.- Collisions in gas phase and related rate of chemical interaction.- Diffusion in gases.- Elementary adsorption - desorption events.- Diffusional deposition of molecules and aerosols in channels.- Diffusion coefficients of aerosols.- Deposition in cylindrical tubes and rectangular channels from laminar flow.- Deposition from laminar and turbulent flow- engineering approach.- Statistical thermodynamics of adsorption.- General.- Mobile adsorption model.- Localized adsorption model. - Production of transactinoid elements, synthesis and transportation of their compounds: Production of TAE in heavy ion induced reactions.- Recoil extraction from the target.- Thermalizing recoils.- Synthesis of volatile compounds.- Experimental findings about kinetics.- Chlorination in gas phase; kinetics and thermochemistry.- Synthesis of group 4 and 6 (oxo)chlorides.- Scavenging of impurities in the gas.- Deposition of nonvolatile elements and compounds from gas flow.- Aerosol stream for transportation of molecular entities.- From gas-solid isothermal chromatography to thermochromatography: General considerations.- Theory.- Retention time in gas-solid IC.- Retention time in TC.- Peak shapes; general.- IC peaks.- TC peaks.- Simulation of IC and TC peak shape and position.- Monte Carlo simulation model.- Discrete event simulation; calculational procedure.- Sample results of simulations.- Vacuum thermochromatography.- Temperature of the VTC peak.- VTC as random walk problem.- Monte Carlo simulation of VTC.- Evaluation and interpretation of experimental data: Evaluation of desorption energy /

enthalpy from the experimental data.- Thermodynamic approach.- Molecular kinetic approach.- Statistical thermodynamic approach.- Non-trivial mechanisms of gas-solid chromatography.- Experimental adsorption enthalpies of heavy element compounds.- Results obtained by the second law treatment.- Results based on molecular kinetics and statistical thermodynamics.- True structure of the column surfaces.- Geometric structure of a fused silica surface.- Chemical modification of the surface of silica.- Effects of actual structure of column surface in experiments with TAE halides.- Analysis of poor-statistics data.- Bayesian approach to statistical treatment.- Sample situations.- Incomplete counting.- Adsorption enthalpy from an IC experiment.- Adsorption enthalpy from a TC experiment.- Systematic errors.

EAN/ISBN : 9781402066023 Publisher(s): Springer Netherlands Format: ePub/PDF Author(s): Zvara, Ivo

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