



Geochemical and thermodynamic specificity of volcanic, hydrothermal and soil aerosols

Renata V. Mukhamadiyarova (1), Yury V. Alekhin (2), Gennady A. Karpov (3), and Marina A. Makarova (4)

(1) The Moscow State University, Geochemistry, Russian Federation (rinutiya@mail.ru), (2) The Moscow State University, Geochemistry, Russian Federation, (3) The Institute of Volcanology and Seismology of RAS, (4) The Moscow State University, Geochemistry, Russian Federation

On the basis of element composition analyses results (ICP-MS) of hydrothermal and soil aerosols condensates, and also results of diagnostics of ultradisperse phases by means of power dispersive x-ray spectrometers features of phase and microelement composition of issue aerosols are discussed. Our researches of streams of polyelement issue from a soil cover and specificity of structure of volcanic aerosols have led us to a conclusion that is geochemistry area practically is not developed in the relation of microelement migration in lithosphere – atmosphere. Nanoaerosol particles (0,001 – 1 microns) submit to laws of gas dynamics and in fluid streams are steady enough. Experimental researches of polyelement emission streams from soils and low-temperature microelements migration have allowed to detail the reasons of rather high values of the soil issue. Complexity of authentic definition of forms of carrying over, structure and dispersion of particles of the gas phase emitting from a soil cover, is substantially connected with absence of methodically well-founded receptions of selection of water condensates, free from aerosol components, and methods of their reliable division in a stationary stage of processes of issue and condensation. Reception of the information on factors of distribution of metals between pore solutions, true gas complexes and mineral phases of soils, an estimation of a role gas electrophoresis at transition to molecular cluster and to water colloid aerosols (0.1 microns and less) have allowed us to clear up estimations of streams of soil issue.

The differentiation of a multicomponent gas phase in near surface conditions at powerful Tolbachinsky eruption (PTE) 1975 – 1976 to formation of many native metals – gold, silver, copper, lead, bismuth, tungsten, numerous intermetallic compounds. In eruption ashes of Kamchatka volcanoes – Karymsky, Bezmyanny, Kljuhevskoy and Shivelutch we found not only iron oxides but also numerous grains of native metals – Fe, Al, Zn, Cu. Geochemical specificity of aerosol carrying over in eruption columns at volcanic eruptions, often consists in high cleanliness individual many native metals allocations from typical elements – impurity. Presence of tungsten allocations without molybdenum and similar examples for other metals force to assume presence of the specific gas complexes which stability sharply changes at variations of pressure and temperatures in eruption columns at eruptions. Our analysis has shown that for a role of such forms of carrying over can apply metals carbonyls, widely used at reception of especially pure substances. These covalent compounds with formally 0-valency Me in a complex kernel contain variable quantity of groups CO in ligand parts and always complete the electronic cover to a cover of following inert gas, i.e. have in external sphere 4, 5, 6 groups CO, that together with the big distinctions in dependences of constants of formation on temperature their disintegration does non-simultaneous. The thermodynamical description superfluous components fugacity for aerosol systems is developed.