

During the Earth's accretion process deep magma oceans were episodically formed. Differentiation of iron took place within the melted zone and small droplets of iron were sinking to the base of the magma ocean due to the density contrast. In the present work we study the process of equilibration between dispersed metal droplets and surrounding silicates that proceeds by the advection transport and diffusion at the rim. We allow for steady state flow of a spherical liquid blob falling in a host liquid and establish the numerical code in axisymmetric spherical coordinates computing the chemical evolution of such heterogeneous system. We focus on determining the time scales of equilibration for which we propose an analytical model based on the boundary layer analysis. The obtained characteristic times are especially for low silicate viscosities very short that supports the idea that the drops attained equilibrium while sinking.