Study of flow fractionation characteristics of magnetic chromatography utilizing high-temperature superconducting bulk magnet

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Abstract. We present numerical simulation of separating magnetic particles with different magnetic susceptibilities by magnetic chromatography using a high-temperature superconducting bulk magnet. The transient transport is numerically simulated for two kinds of particles having different magnetic susceptibilities. The time evolutions were calculated for the particle concentration in the narrow channel of the spiral arrangement placed in the magnetic field. The field is produced by the highly magnetized high-temperature superconducting bulk magnet. The numerical results show the flow velocity difference of the particle transport corresponding to the difference in the magnetic susceptibility, as well as the possible separation of paramagnetic particles of 20 nm diameter.

Keywords: magnetic chromatography, field flow fractionation, HTS bulk magnet

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