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*Title:* SELECTIVE SEPARATION OF ULTRA-FINE PARTICLES  
BY MAGNETOPHORESIS

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## **Selective Separation of Ultrafine Particles by Magnetophoresis**

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The selective and-specific extraction of species of interest from local environmental and other sample sources are important for scientific research, industrial processes, and environmental applications. A novel process for selective separation of ultrafine particles using "magnetophoresis" is investigated. The principle of this process is that the direction and velocity of particle movement in a magnetic field are determined by magnetic, gravitational, and drag forces. By controlling these forces, one is able to control the migration rates of different species and then magnetically fractionate mixtures of species into discrete groups. This study demonstrated for the first time the selective separation of various species, such as iron (III) oxide, cupric (II) oxide, samarium (III) oxide, and cerium (III) oxide, by magnetophoresis. To better understand this phenomenon, a force-balance model was developed that provides a good interpretation of the experimental results.

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