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Mineral-Mineral Particle Collisions During Flotation Remove Adsorbed Nanoparticle Flotation Collectors

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Abstract

Flotation of 43 μm diameter, hydrophilic glass beads with hydrophobic cationic polystyrene nanoparticle flotation collectors revealed that bead-bead collisions during conditioning and flotation caused the irreversible abrasion of the adsorbed nanoparticles. The abraded particles were present in the suspension as large aggregates. Nanoparticle abrasion explains why small polystyrene particles are more effective than larger ones, and why, much higher dosages of larger nanoparticles are required for the same flotation performance. These behaviors also were demonstrated with a phenomenological model of the abrasion dynamics.

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