



Flotation Separation of Muscovite from Quartz Using Mixed Anionic/Cationic Collectors

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The flotation separation of muscovite from quartz was investigated using mixed sodium oleate/dodecylamine (NaOL/DDA) collectors. The flotation experiments were conducted on single minerals and their collecting performances were studied by means of adsorption amounts and molecular dynamics simulation. Flotation results show that muscovite presents good floatability while quartz exhibits poor floatability in alkaline condition. Adsorption amounts show that both NaOL and DDA can adsorb onto surfaces of muscovite and quartz in presence of mixed surfactants. Molecular dynamics simulation indicates that DDA plays an important role in the adsorption of mixed surfactants on these two mineral surfaces. The molecules of mixed NaOL/DDA are arranged in a rigid and well-ordered packing on muscovite (001) surface. Only a few DDA adsorb on quartz directly, and rest DDA and NaOL molecule exist near by the quartz surface, forming a hydrophilic cylinder-like structure. This study may provide guidance for the flotation mechanism and application of mixed anionic/cationic collectors.