

Froth stability and entrainment evaluation of a novel frother for KCl/NaCl flotation

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September 1, 2022

Abstract

The rate of KCl recovery by froth flotation using low-grade carnallite is 70–85%. Herein, a novel frother, dipropylene glycol butyl ether (DPNB), was prepared to increase the flotation efficiency of KCl recovery systems. DPNB could be applied at only half the dosage of the conventional frother methyl isobutyl carbinol (MIBC) and achieve a KCl recovery rate of 94.8–98.6% with a high KCl grade (63.2–66.5%). To date, these results are the best reported for pneumatic flotation. DPNB had a 10% higher maximum dynamic stability factor compared with of MIBC; moreover, the apparent entrainment velocity of DPNB was half that of MIBC. The molecular structure of DPNB had hydroxyl and ether groups, which promoted interactions with water, thereby contributing to its excellent froth stability. DPNB is environment friendly owing to its low volatility and, thus, a promising frother for the green and highly efficient flotation of KCl/NaCl.

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