

Collector, Oily Extender or Co-frother? Investigating the role of Tecflote in sulfide flotation

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Tecflote is a new group of nitrile-based collectors for sulfide flotation. Plant- and laboratory flotation tests showed that its application improves especially process selectivity for complex sulfide ores. Water insolubility results in interesting implications for the actual working mechanism. Tecflote can be either present as emulsion droplets or already spread on the water air interface of the bubbles in the pulp. It is yet not understood, if Tecflote is directly adsorbing on the mineral surface or if it solely affects the air water interface changing its rheology and therefore the particle-bubble contact.

Parallels can be found in potash flotation with amine collectors in which the transport of the insoluble collector molecules to the mineral surface is critical for the overall flotation performance and conventional frothers are known enhancing the spreading of the amine in the water air interface.

Oily substances as kerosene or diesel are used in sulfide flotation to enhance the natural hydrophobicity of sulfide minerals, build up hydrophobic agglomerates and therefore especially improve the flotation performance of small sulfide particles. Tecflote could cause similar effects. However, this would not explain why it mainly improves the flotation selectivity.

Different investigations including contact angle measurements, AFM studies, micro-flotation experiments and XPS studies are conducted to obtain a better understanding of the actual working mechanism of Tecflote. Due to the insoluble character Langmuir-Blodgett technique is used to investigate the behaviour of Tecflote in the air-water interface and to deposit defined layers of Tecflote on mineral substrates for the above-mentioned studies. An interferometric set up is used to investigate the influence of Tecflote on the film thinning between an air bubble and a

mineral substrate. In addition, possible synergistic effects for the combination of Tecflote and conventional frothers (e.g. MIBC) are studied.