

POSTER ABSTRACT

**NUCLEATION INITIATED BY HIGH FREQUENCY SOUND FOR
A NEW PANBOILING SLURRY – FROM DUST TO DIAMONDS**

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Abstract

The slurry for the panboiling process is globally produced by a ball-milling method. The preparation suffers from the intrinsic drawback that the plane surfaces of the crystals are destroyed by the primitive hammering action of the steel balls. This subsequently leads to an undesirably high inclusion of impurities in the crystal as it grows. The preparation also results in the nuclei having a broad crystal size distribution. Slurries collected from some South African mills were found, using an image analysis tool, to have mean crystal sizes and coefficient of variances (CVs) of about 5-10 μm and 50-75%, respectively. The large CV is of particular concern as a large CV massequite is also likely to be produced, with smaller crystals escaping through centrifugal screens, reducing recoveries. In sugar boiling the CV is slightly improved by washing away the smaller crystals. However, this process is energy intensive.

Sucrose nucleation initiated by high frequency sound has been investigated by several authors but, to the best knowledge of the authors of this poster, is not practised in the industry. Its use has been postulated to disrupt the water molecules surrounding the sucrose molecules, to break their hydrogen-bonded structure and initiate a high number of nuclei occurring spontaneously and uniformly. This poster reports on some tests performed using sound together with highly concentrated sugar solutions and some organic solvents in an attempt to improve the quality of slurry delivered to the panfloor.

Keywords: slurry, panboiling, crystallisation, insonation, ultrasound, coefficient of variance (CV)