

## Couette–Taylor Crystallizer: Mathematical Modeling Phase Transformation of Guanosine 5-Mono Phosphate in Drowning-out Crystallization

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The phase transformation of guanosine 5-monophosphate (GMP) during drowning-out crystallization in a continuous Couette–Taylor (CT) crystallizer was studied experimentally and numerically. At a steady state, the phase transformation of the amorphous GMP into hydrate crystals was monitored along the axial direction of the CT crystallizer when varying the crystallization conditions, including the rotation speed of the inner cylinder of the crystallizer and the feed concentration. Under the assumption of plug flow behavior for the fluid motion in the CT crystallizer, the simple model predictions matched well with the experimental profiles for the three components along the axial direction of the crystallizer, allowing estimates for the kinetics of the phase transformation, including the mass transfer coefficients for dissolution and growth. According to the model predictions, the rates of amorphous GMP dissolution and hydrate crystal growth were both competitive to control the phase transformation in the CT crystallizer, and about 10 times higher than those in a stirred tank crystallizer.