



AMT TN-09

Key Summary of Simple Magnesium Solids Handling in the Coflore® ATR

Overview

Coflore flow reactors are highly versatile systems suitable for a wide-range of chemical processes including multiphasic reactions. The correct choice of peripheral equipment such as reagent feed pumps is critical for multiphasic processes involving slurries.

This technical note looked to investigate the solids-handling abilities of a simple reactor set up, with a peristaltic pump directly connected to the ATR, running at ambient pressure and temperature. Magnesium powder was chosen in order to simulate the suitability of Coflore systems for Grignard reactions.



Figure 1: The Coflore ATR.



Figure 2: The Coflore ATR experimental set up.

Experimental Procedure

This testing looked to investigate the solids handling ability of the Coflore ATR and a peristaltic pump with a 10 wt% magnesium powder in petroleum ether 40-60.

For all testing, the feed vessel stirrer RPM was set to 300, and the ATR agitation set to 4 Hz. The slurry flow was “top-down”. The peristaltic pump RPM was set to the desired speed and the system allowed to reach equilibrium over 30 minutes prior to sampling.

Samples were then taken at the outlet of the ATR via a three-way valve. Empty, full and concentrated masses of each sample were taken in order to determine the masses of magnesium at petroleum ether in the sample and thus determine the outlet slurry weight %. Samples were taken at regular time intervals.

Results

Magnesium slurry was successfully recycled through the Coflore ATR without blocking for extended residence times, summarised in the table below. The testing performed showed how even with an extremely simple reactor peripheral equipment set up, it is possible to successfully dose in magnesium slurries to the ATR for residence times of >14 minutes in a 10 L ATR. For further information related to this study, please contact info@amt.uk.

Flow Rate (mL/min)	Residence Time in the Experimental Setup (min)	Average Slurry Concentration (wt%)	Residence Time in a 10 L ATR (min)
1000	1.6	10.7	10
700	2.3	10.9	14.4