

A Study of the Cerium-catalyzed Briggs-Rauscher Oscillating Reaction

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Cerium(III) catalysts can replace manganese(II) in the classic Briggs-Rauscher oscillator also containing acid, iodate, hydrogen peroxide, and malonic acid. H_2SO_4 was used as an acid; if HClO_4 is used, cerium iodate precipitates. Cerium(III) oxalate typically precipitates by the time oscillations end. Ce(III) at low concentrations is roughly three times as effective as Mn(II). At higher catalyst concentrations, there is a leveling effect for both. Oscillatory behavior with different concentrations is explored. Response to concentration change and inhibitors is similar with both catalysts. The mechanistic steps involving the catalysts must be similar. Ce(IV) is also an effective catalyst, although some cerium(IV) iodate may precipitate immediately.

Key words: Manganese-catalyzed, Cerium Oxalate, Cerium(III), Cerium(IV)