

Design of Photo-Controlled Chemical Oscillators

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摘要:

This article reviewed recent progresses in the design of a new class of chemical oscillators and developed a generic model that could qualitatively reproduce those photochemical oscillations seen in experiments. The two oscillators discussed in this report are based on the benzoquinone and its derivatives, in which external illumination is vital in initiating and sustaining the reaction processes. Nonlinear behavior in these two photo-controlled chemical oscillators are analyzed as a function of light intensity and the initial concentration of reagent benzoquinone, 1,4-hydroquinone, 2-methyl-1,4-benzoquinone, bromate, and sulfuric acid. A generic model proposed initially for the uncatalyzed bromate-aromatic compounds reactions was modified here to account for the photolysis of 1,4-benzoquinone or 2-methyl-1,4-benzoquinone. The modified model qualitatively reproduced chemical oscillations and their dependence on light intensity.

关键词: Autocatalytic reaction Chemical oscillations Nonlinear feedback Photochemistry

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