

丝氨酸-BrO<sup>-</sup>-3-Mn<sup>2+</sup>-H<sub>2</sub>SO<sub>4</sub>体系振荡反应的研究

李和兴,王勤,周海念

上海师范大学化学系,上海(200234)

收稿日期 修回日期 网络版发布日期 接受日期

**摘要** 首次报道了间歇釜中以丝氨酸(Ser)-BrO<sup>-</sup>-3-Mn<sup>2+</sup>-H<sub>2</sub>SO<sub>4</sub>为体系(简称Ser-BZ体系)的新型BZ类振荡反应,其特征如下:(1)虽然Ser不能发生溴代反应,但即使在无丙酮或惰性气体流时也能在间歇釜中观察到持续振荡;(2)振荡诱导期极短(~0),振荡次数较少(<11次);(3)振荡反应受到Cl<sup>-</sup>,Br<sup>-</sup>,丙烯腈等的抑制;但当加入足够量Ag<sup>+</sup>使[Br<sup>-</sup>]的振荡抑制后,仍可在Pt电极上观察到振荡现象。根据上述特征和反应产物分析,推测Ser-BZ振荡反应可能是自由基-控制模型,而非Br<sup>-</sup>-控制模型。加入适量丙酮可诱导连续振荡反应,归因于两种控制模型的共存。通过对Mn<sup>3+</sup>-Ser和BrO<sup>-</sup>-3-Mn<sup>2+</sup>反应的动力学研究,并结合FKN机理,对Ser-BZ振荡反应机理进行了初步讨论。

**关键词** [丝氨酸](#) [硼酸盐](#) [反应机理](#) [动力学](#) [自由基反应](#) [振荡化学反应](#)

分类号 [0641](#)

**Studies on the oscillating reactions in closed serine-BrO<sup>-</sup>-3-Mn<sup>2+</sup>- H<sub>2</sub>SO<sub>4</sub> system**

Li Hexing,Wang Qin,Zhou Hainian

Shanghai Normal Univ, Dept Chem.Shanghai(200234)

**Abstract** A novel Belousov-Zhabotinskii(BZ) type oscillating reaction was observed in a closed serine(Ser)-BrO<sup>-</sup>-3-Mn<sup>2+</sup>- H<sub>2</sub>SO<sub>4</sub> system(Ser-BZ system), which exhibited the followign characteristics: (1)Although Ser is unable to be brominated, the sustained oscillations could still be observed in the above system under batchreactor conditions even in the absence of either acetone or inert gas flow. (2)The present oscillations displayed extremely short induction period(0) and very few oscillation number(<11). (3)Cl<sup>-</sup>, acrylonitrile, or Br<sup>-</sup> could effectively inhibit the oscillations. However, in the case when enough Ag<sup>+</sup> was addedinto the system to completely inhibit the oscillations in [Br<sup>-</sup>], the oscillations on the Pt-electrode could still be observed. Based on the above oscillation characteristics and the product analysis, it was concluded that the present oscillations in Ser-BZ system may be radical-controlled rather than Br<sup>-</sup>- controlled. Addition of suitable amount of acetone could induce the sequential oscillatinos owign to the coexistence of these two types of controlling models. According to the kinetic studies on the reactions of Mn<sup>3+</sup>-Ser and BrO<sup>-</sup>-3-Mn<sup>2+</sup>, together with the FKN mechanism, the oscillating mechanism in the present system was discussed briefly.

**Key words** [SERINE](#) [BORATES](#) [REACTION MECHANISM](#) [DYNAMICS](#) [FREE RADICAL REACTION](#) [OSCILLATION CHEMICAL REACTION](#)

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