Optimization of Pyrogallol Based Manganese / Ferroin Catalyzed Nonlinear Chemical Systems and Interaction with Monomeric and Polymeric Entities

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Abstract : These the influence of initial reagent concentrations on the Belousov-Zhabotinsky (BZ) system with Mn2+/Mn3+ as redox catalyst, inorganic bromate as oxidant and pyrogallol as organic substrate was studied. The reactions were monitored by potentiometery in oxidation reduction potential (ORP) mode. The aforesaid reagents were mixed with varying concentrations to evolve the optimal concentrations at which the reaction system exhibited better oscillations. The various oscillatory parameters such as induction period (tin), time period (tp), frequency (v), amplitude (A) and number of oscillations (n) were derived and the dependence of concentration of the reacting species on these oscillatory parameters was interpreted on the basis of the Field-Koros-Noyes mechanism. Ferroin based BZ system with pyrogallol as organic substrate was optimized under CSTR condition at temperature of 30 ± 0.10 C Effect of molecules like monomer and polymer as additives to the system was checked and their interaction with the system was also studied. It has been observed that the monomer affects the time period, while the polymer has its effect on the amplitude of oscillations because of monomer's interaction with the bromine and polymer's with that of the Ferroin.

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