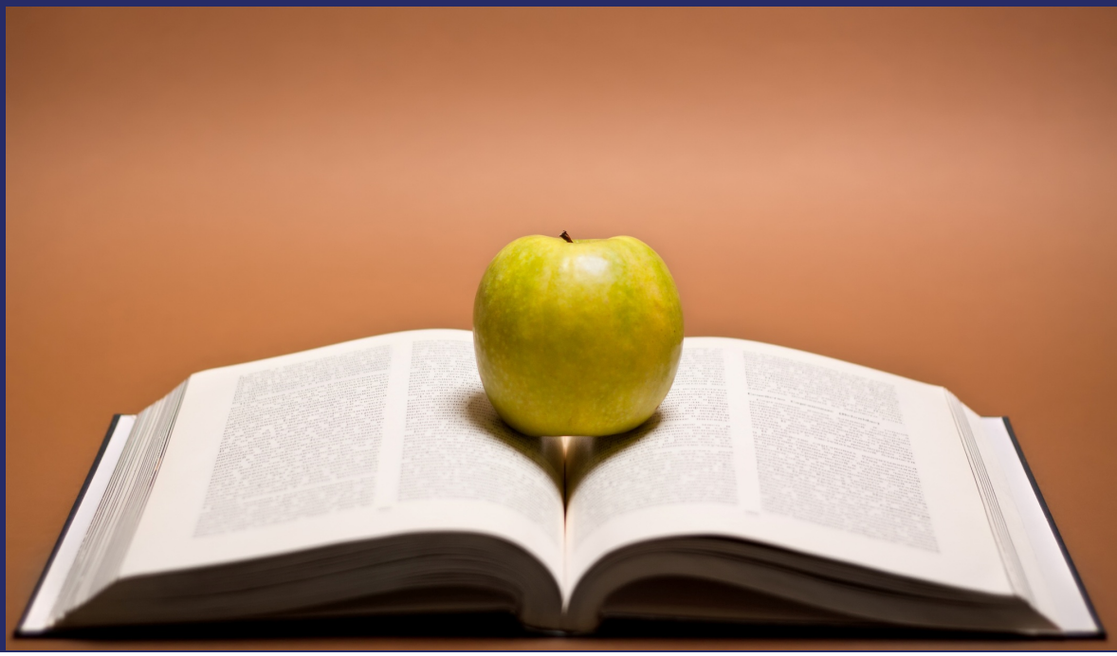
Five reaction schemes are suggested for the initiated nonbranched-chain addition of free radicals to the multiple bonds of the unsaturated compounds. The proposed schemes include the reaction competing with chain propagation reactions through a reactive free radical. The chain evolution stage in these schemes involves three or four types of free radicals. One of them is relatively low-reactive and inhibits the chain process by shortening of the kinetic chain length. Based on the suggested schemes, nine rate equations (containing one to three parameters to be determined directly) are deduced using quasi-steady-state treatment. These equations provide good fits for the nonmonotonic (peaking) dependences of the formation rates of the molecular products (1:1 adducts) on the concentration of the unsaturated component in binary systems consisting of a saturated component (hydrocarbon, alcohol, etc.) and an unsaturated component (olefin, allyl alcohol, formaldehyde, or dioxygen). The unsaturated compound in these systems is both a reactant and an autoinhibitor generating low-reactive free radicals. The energetics of the key radical-molecule reactions is considered.



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