

Kinetics of Thermal Oxidative Decomposition of Zinc Porphyrin and Phthalocyanine Complexes

N. Sh. Lebedeva, N. A. Pavlycheva, and A. I. V'yugin

*Institute of Solution Chemistry, Russian Academy of Sciences,
ul. Akademicheskaya 1, Ivanovo, 153045 Russia
e-mail: nsl@isc-ras.ru*

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Abstract—Thermal oxidative decomposition of certain zinc porphyrin and phthalocyanine complexes was studied using an installation for thermal analysis, and kinetic parameters of the thermal oxidation of these compounds were determined. The introduction of peripheral alkyl substituents into porphyrin molecules enhances the macroring stability with respect to the thermal oxidation. In cases of benzoporphyrins and phthalocyanines, this effect is leveled off because of spatial remoteness of the substituent from the reactive center of the macroring. The substances studied decompose in several steps; the initial step corresponds to the oxidation of peripheral substituents of the macroring. For the majority of the substances studied, the order of the thermal oxidation reaction is 1, and the main step controlling the thermal oxidation process is diffusion.

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