Energy Exchange During Grazing Collision of Two Chain Molecules

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A theoretical model is presented, which describes the collision of two polyatomic organic molecules grazing each other at relative velocities below Bohr velocity. If the interacting molecules contain chains of diatomic dipoles, each of these chains can acquire and accumulate IR energy quanta by transition into collective excited vibrational states (excimols) during the contact period ($\sim 10^{-12}$ s). The excimol energy transport from one of the chains to close trap-bonds (energy acceptors) of the molecule as well as the energy exchange processes between the two molecules can lead to their fragmentation or electronic excitation. The probability functions of all mentioned processes were derived and presented in analytical form.

Key words: Organic Molecules; Grazing Collision; Energy Exchange; Vibrational Excitation.