Synopsis of Original Research Paper

Mechanism of thermal transport of bulk water absorbed far or near infrared wave

Seiji Katayama, Kazuo Kozawa

School of Pharmaceutical Sciences, University of Shizuoka

During continuous irradiation far or near infrared (FIR, NIR) on water in cylindrical cell, time courses of temperature rise of water at both the irradiated and opposite ends of the cell were observed by using a thermometer with high precision of 1/1000 deg, taking into account radiation of heat from the sample water.

Under an experimental condition without radiation of heat from sample system, the transport process of thermal energy obtained from FIR, namely, the time course of temperature rise, was mostly in accord with that from NIR, while a little but certain difference was observed in the beginning of both irradiations. This suggested that non-equilibrium lattice vibration of water (equivalent to internal energy) was induced temporarily in the beginning of FIR or NIR irradiation, but it eventually approached to an equilibrium one, because of cross-relaxation between energy levels of various intramolecular motions. The difference appeared in the beginning of the irradiations could be taken as a characteristic of FIR.