

。甲南大学大学院自然科学研究科物理学専攻

1. Exciton Dynamics in Pyrene and α -Perylene Crystals
at Low Temperatures

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Abstract

Pyrene is a dimeric crystal in which each lattice point is occupied by a pair of molecules. The luminescence spectra in pyrene crystals have been measured between room temperature and near liquid helium temperature. In carrying out this investigation, technical difficulties have to be overcome. There is a phase transition in pyrene crystals at about 120 K. In order to supercool the specimens, a gas-flow cryostat has been used. A weak free exciton luminescence band at low temperatures due to free excitons which can not go over the potential barrier between the free exciton state and the self-trapped exciton state has been found. The weakness of free exciton luminescence at low temperatures in supercooled pyrene crystals is explained.

The crystal structure in α -perylene is the same as pyrene crystal's. Luminescence spectra in α -perylene crystals have been also measured between room temperature and 4.2 K. A new luminescence band which can be regarded as free exciton luminescence has been found at 4.2 K.

Vibronic luminescence bands similar to Y luminescence bands in α -perylene crystals have been observed in pyrene crystals below 50 K on the higher energy side of the self-trapped exciton luminescence band. These vibronic bands have been considered as characteristics in dimeric crystals.

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1. 宇宙線ミューオンの強度測定

難 波 剛

地磁気緯度 25°N の sea-level で宇宙線ミューオンの垂直絶対強度を測定し, Rossiの値より大きい Allkofer et al. の値に一致する結果を得た。