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► To cite this version:

Bernard Champagnon, M. Ferrari, L. Boudes, W. Granier. Size effects in CdS nanocrystals imbedded in glasses obtained by sol-gel route. Journal de Physique IV Proceedings, 1994, 04 (C4), pp.C4-615-C4-615. 10.1051/jp4:19944165 . jpa-00252622

HAL Id: jpa-00252622

<https://hal.science/jpa-00252622>

Submitted on 1 Jan 1994

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Size effects in CdS nanocrystals imbedded in glasses obtained by sol-gel route

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Quantum confinement effects in semiconductors are very extensively studied as the optical properties of the material can be modulated by size. Large non linearity coefficient and fast response time are expected in CdS nanocrystals. Among the technique used to prepare nanoparticles in a solid matrix the sol-gel route is promising as it allows different concentration, size and shape to be obtained.

A bulk $\text{Na}_2\text{O-SiO}_2\text{-B}_2\text{O}_3$ glass containing different amount of CdS was obtained by sol-gel route. Characterization by low frequency Raman scattering and absorption spectroscopy was performed in order to relate the optical properties to the size of the nanocrystals. The shift of the absorption band and the Raman scattering results confirm the formation of crystallites, with size below 20 nm, in different samples.