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Quantum confinement effects on superconducting properties of Lead nanocrystals HERVE AUBIN, CNRS-ESPCI, HELENA MOREIRA, UPM6, BENOIT MAHLER, ESPCI, BENOIT DUBERTRET, CNRS-ESPCI — We developed a new chemical synthesis method for producing large quantities of monodispersed lead (Pb) nanocrystals. They are obtained from the alcohol reduction of a mixture of two lead carboxylates with alkyl chains of different lengths, dissolved in a high temperature solvent. The nanocrystals obtained are protected from oxidation and aggregation by long chain fatty acids and their diameter can be tuned to reach values as low as 10 nm. Our results suggest that monodispersed particles are obtained when nucleation and growth occur at distinct temperatures, possibly as a consequence of different reactivities of the two lead carboxylates used in the solution. Owing to the large quantities of monodispersed particles produced, thermodynamics studies as function of particles diameter become possible. In particular, we will present a study of the effect of quantum confinement on superconducting properties of these Pb particles through SQUID magnetometry measurements.

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