

The paper reports on accurate measurements of the excitonic ground state transitions in individual, strain free, GaAs quantum dots. We determine the spectral width and the energy of the zero-phonon line as a function of the temperature for a series of quantum dots with different sizes. In particular, the thermal broadening is well reproduced by a thermally activated process having a single activation energy, corresponding to the GaAs LO phonon energy, independently of the dot size. Similarly, the energy of the zero-phonon line follows the GaAs gap temperature dependence irrespective of the dot size. Our findings demonstrate that (a) the exciton decoherence in quantum dots cannot be attributed to inelastic electron-phonon scattering but rather to pure dephasing processes driven by GaAs-LO phonons and (b) there is no quantum size effect on the excitonic energy renormalization with the temperature.