

This work deals with room temperature spin dynamics in semiconductor CdS nanocrystals. To study this the time- and polarization-resolved pump and probe technique, time-resolved Faraday rotation, and time-integrated polarization-resolved photoluminescence were used. It was found that the time- and polarization-resolved pump and probe technique is the most suitable method to study the dynamics of spin-polarized carriers. In the dynamics of spin coherence three distinct time constants were found: 300 fs, 8 ps and 10 ns. The longest time constant, with a relative weight of 47%, was attributed to spin dephasing of electrons due to the hyperfine interaction with nuclei. Such a long coherence time means that even at room temperature basically all electrons throughout their lifetime maintain the original spin-polarization. This shows that semiconductor nanocrystals are a very promising material for spintronics and quantum computation where the long spin-relaxation time is essential.