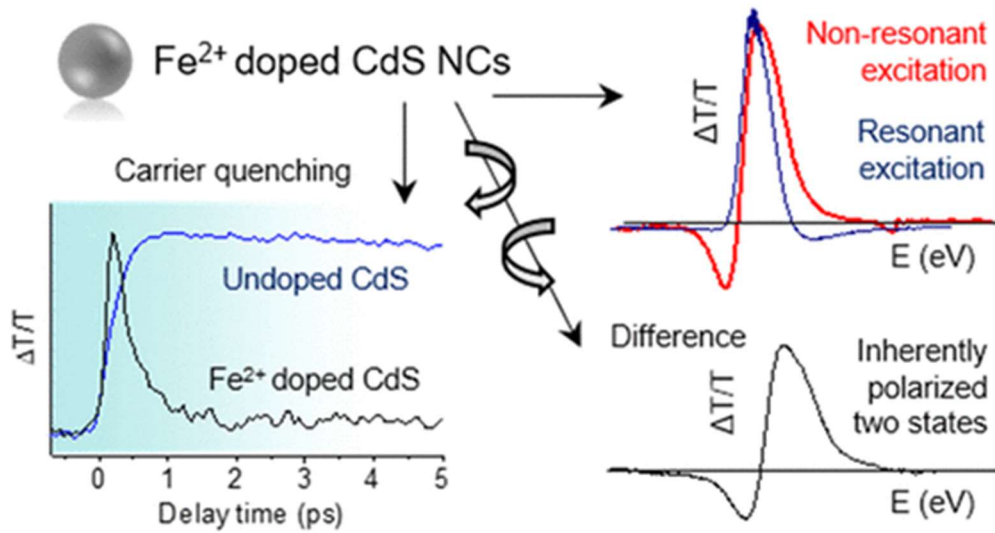


Abstract



Fe²⁺ doping in II-VI semiconductors, due to the absence of energetically accessible multiple spin state configurations, has not given rise to interesting spintronic applications. In this work, we demonstrate for the first time that the interaction of homogeneously doped Fe²⁺ ions with the host CdS nanocrystal with no clustering is different for the two spin states and produces two magnetically inequivalent excitonic states upon optical perturbation. We combine ultrafast transient absorption spectroscopy and density functional theoretical analysis within the ground and excited states to demonstrate the presence of the magneto-optical Stark effect (MOSE). The energy gap between the spin states arising due to MOSE does not decay within the time frame of observation, unlike optical and electrical Stark shifts. This demonstration provides a stepping-stone for spin-dependent applications.

KEYWORDS:

Stark effect; magneto-optics; spintronics; Fe doping; luminescence quenching