

# [The cds particles added to supporting electrolyte.](https://assignbuster.com/the-cds-particles-added-to-supporting-electrolyte/)

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The influence of concentration of CdS particles insupporting electrolyte on photocatalytic activity (PA) of PEO coatings ispresented in Fig. 4. C0 is the initial concentration of MO and C isthe concentration after time t. PA varies with the concentration of CdSparticles added to supporting electrolyte. TiO2/CdS coatings formed insupporting electrolyte with addition of CdS particles up to 0. 5 g/L show betterPA than pure TiO2 coating, with the highest PA observed for thecoating formed in supporting electrolyte with addition of 0.

4 g/L of CdSparticles. On the other hand, high concentration of CdS particles in supportingelectrolyte significantly reduced PA and even showed significantly lower valuesthan for the pure TiO2. This indicates that CdS particles haveconsiderable influence on the photocatalytic activity of TiO2/CdScoatings, i. e., there is an optimal concentration of CdS in TiO2coatings that depends on the amount of CdS particles in the supportingelectrolyte. Taking into account that the influence of CdSparticles incorporated into TiO2 coatings on morphology and phasestructure is negligible, the main contribution of CdS particles to the PA maybe in extending the optical absorption range of TiO2/CdS coatings orin preventing fast recombination process of photogenerated electron/hole pairs.

Fig. 5 shows UV–Vis DRS spectra of pure CdS powder and prepared coatings formedin a supporting electrolyte with various additions of CdS particles. Obviously, TiO2/CdS coatings do not show the shift of the absorptions intovisible light region. All spectra show the band edge at about 385 nm. The absenceof adsorption shift might be attributed to low concentration of CdS particlesincorporated into coatings, indicating that CdS particles are suppressing therecombination of photogenerated electron–hole pairs. On the other hand, ifconcentration of CdS particles incorporated into TiO2 coatings istoo high, it increases the concentration of recombination centers forelectron–hole pairs, resulting in lower PA. High sensitivity and nondestructive character renderPL technique useful in the field of photocatalysis because information such asthe efficiency of charge carrier trapping, immigration and transfer can beobtained 22. It is generally acknowledged that the increase of PL intensitycorresponds to decrease of photocatalytic activity, indicating fast recombinationof electron-hole pairs.

PL emission spectra of prepared coatings excited at 350nm are shown in Fig. 6a.  Rise inconcentration of CdS particles up to 0. 4 g/L in electrolyte causes a decreasein PL intensity, which then starts to increase up to concentration of 1. 0 g/L. These results are in accordance with photocatalytic measurements (Fig. 6b), i.

e. the decrease of PL intensity corresponds to increase of PA, indicatingslow recombination of electron–hole pairs. For higher concentrations of CdSparticles in supporting electrolyte (2 g/L and more) a simultaneous decrease ofPL intensity and photocatalytic activity can be related to increased presenceof CdS dopants which become capture centers for photoinduced electrons, so thatthe recombination of electron–hole pairs can be effectively inhibited.