Supplementary data

Emission spectra of the lamp.

For the photocatalysis experiments, a 280 W mercury quartz lamp PLK-5 with the lighter LRV (Polam) was used. The lamp spectrum consists of 30% UV light (15% UV-C, 8% UV-B 7% UV-A), 15% visible light and 55% IR. The emission spectrum ranges from 180 nm to 623 nm with some dominating wavelengths: 248 – 365 nm (UV), 404.7/407.8 nm (violet), 435.8 nm (blue), 546.1 nm (green) and 577/579.1 nm (yellow). Using the cut-off filter in the form of thick glass plate, UV and ionization wavelength ranges of the spectrum were removed for the purpose of our experiments.
Here is the emission spectrum of the lamp presented:

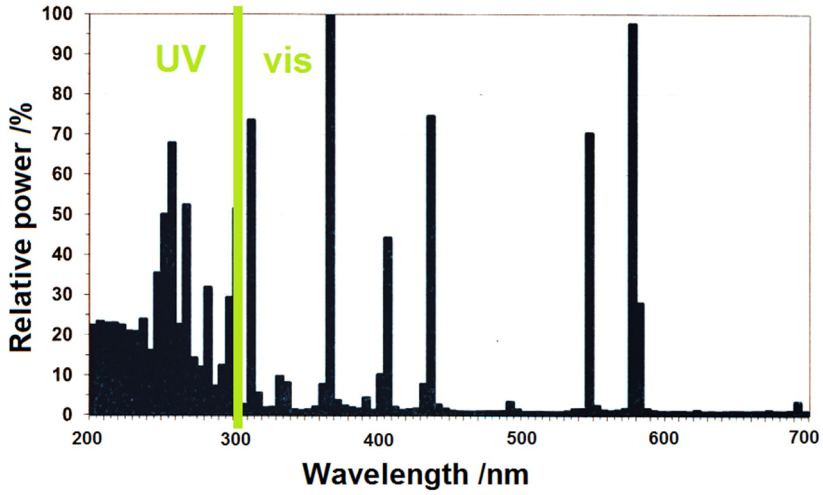

Figure S1. Emission spectra of the quartz mercury lamp used for photocatalysis.

Electrochemical Impedance Spectroscopy (EIS).

We have performed also the impedance spectroscopy experiments (EIS), as in Ref. 73. Classical three-electrode system in a glass electrochemical cell was assembled with glassy carbon electrode (GCE – surface area 0.28 cm^2) with drop-cast CdS nanostructures as working, Pt mesh as counter and Ag,AgCl|3M KClaq as reference electrode. The experiments were carried out in 0.1 M Na_2SO_4 aqueous solution in the dark and under illumination with 300 W quartz mercury lamp as in the case of photodegradation experiments. Figure S2 is presenting the Nyquist plot of Z'' (ohm) vs. Z' (ohm) with red curve and blue curve representing the GC/CdS system under dark and under illumination, respectively. The resultant Nyquist plots that can be assigned to the changes in the interfacial impedance due to the illumination, are shown in Fig. S2. It can be seen that the radius of the arc for the case of the same system (GCE/CdS/0.1M Na_2SO_4) under illumination is smaller than that in the dark. Qualitatively, this can be assigned to lowering of charge transfer impedance across the interface due to the generation of new charges (electrons and holes) in the interfacial layer, making the CdS nanostructure suitable for photocatalytic applications.

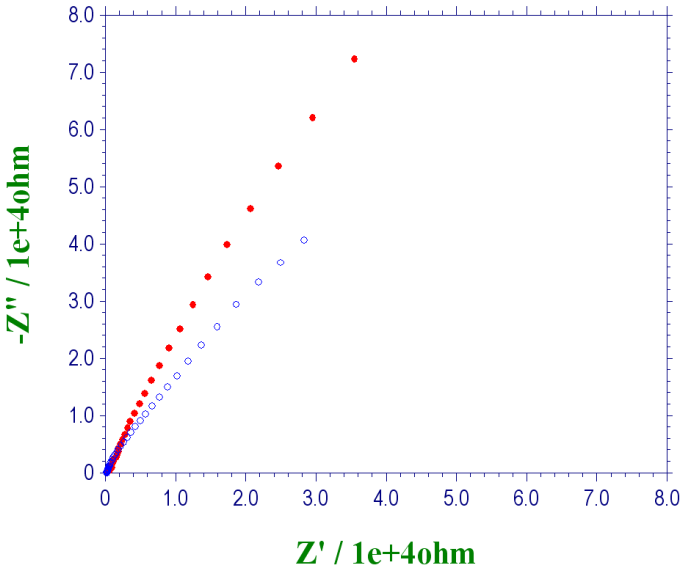

Figure S2. Electrochemical Impedance Spectroscopy graph of CdS nanoparticles deposited on glassy carbon electrode in 0.1 M sodium sulfate solution recorded under potential bias 0.5 V; red dots – GC/CdS system under dark and blue dots – GC/CdS system under illumination.