Titanium was used as supporting electrolyte. high purity

Titanium samples ofdimensions 2. 5 cm × 1 cm × 0. 025 cm were obtained from 99.

95% purity titaniumsheet. Samples were ultrasonically cleaned in acetone and distilled water, dried in a warm air stream and sealed with insulation resin leaving onlysurface of 1. 5 cm × 1 cm accessible to the electrolyte.

The experimental setupused for PEO is described in Ref. 18. Water solution of 10 g/L sodiumphosphate dodecahydrate ($Na_3PO_4 \cdot 12H_2O$) was used assupporting electrolyte. High purity CdS powder (Sigma Aldrich) was added tosupporting electrolyte in concentrations up to 8 g/L. Temperature of the electrolyte was maintained at(10 ± 1) °C during PEO. Titanium samples were anodized at constant currentdensity of 150 mA/cm2.

Surface morphology was analyzed byscanning electronic microscopy (SEM)JEOL 840A equipped with energy dispersive X-ray spectroscopy (EDS). The ratio of titanium and cadmium in formed coatings was determinedusing a Shimadzu XRF-1800 wavelength dispersive X-ray fluorescencespectrometer. Crystalline phases were identi? ed by X-ray di? raction(XRD) in Bragg–Brentano geometry using a Rigaku Ultima IV diffractometer.

Diffractionpeaks observed on XRD patterns are identified using Rigaku PDXL 2 software andCOD database. The Raman spectra were excited using the 532 nm diode solid statelaser, with the laser power of 10 mW, and collected on a Thermo Scientific DXR Raman microscope equipped with research opticalmicroscope and CCD detector. UV–Vis diffuse reflectance spectra (DRS) were recorded using a UV–Vis spectrophotometer(Shimadzu UV-3600)

and photoluminescence (PL) spectra recorded using a HoribaJobin Yvon Fluorolog FL3-22 spectrofluorometer, with Xe lamp as the excitationlight source at room temperature. For photocatalytic activity evaluationof TiO2/CdS coatings, the photodegradation of aqueous methyl orange(MO) solution at room temperature under simulated solar irradiation was used asa model reaction. The experimental setup and procedures used for photocatalyticmeasurement are described in Ref.

19.