Photoelectrochemical processes on TiO_2/MoO_3 film heterostructures

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Titanium dioxide is known to be an effective photoelectron acceptor in the third-generation of photovoltaic solar converters. One of the ways to decrease the recombination of photogenerated charge carriers during their transport and therefore to increase the quantum efficiency of a solar cell consists in employing binary oxide heterostructures. The difference in the conduction band edge position of TiO_2 and MoO_3 favors the separation of photogenerated electrons and holes and the increase in the solar cell quantum efficiency. TiO_2/MoO_3 film heterostructures were prepared using the mixed colloidal solutions of the corresponding hydrated oxides followed by thermal treatment (450 ºC, 2 hours) of the deposited films. The dependence of photoelectrochemical properties (photocurrent, photopotential, spectral response) inherent to TiO_2/MoO_3 film electrodes on the MoO_3 content ranging from 1 to 10 mol. % was studied.