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Formation of Palladium (II) Oxide within Titanium Dioxide Electrospun Nanofibers: Combined Raman and X-ray Diffraction Study DANIEL ISAACS, PATRICK MCMANUS, NENAD STOJILOVIC, University of Wisconsin Oshkosh, MAJA SCEPANOVIC, MIRJANA GRUJIC-BROJCIN, NATASA TOMIC, Institute of Physics, University of Belgrade, LAILA SHAHREEN, GEORGE CHASE, The University of Akron — TiO_2-PdO composite submicron fibers were produced using electrospinning method. The morphology of the fibers was probed using Scanning Electron Microscopy, whereas Raman Spectroscopy and powder X-Ray Diffraction experiments were used for probing the crystalline phases of pure TiO_2 and TiO_2 – PdO fibers. In particular, the effects of annealing time (at 600 ^oC) on the crystal structure and the role of embedded PdO were investigated. The results of Raman scattering measurements have shown dominant anatase TiO_2 phase in all samples. The crystallinity of anatase phase, as well as the appearence of rutile and brookite phases, depend on annealing and doping conditions. The existence of PdO within TiO_2 stabilizes its anatase phase, and the Raman modes ascribed to PdO become more pronounced with annealing. The combination of Raman and X-Ray diffraction techniques proves to be a powerful tool in characterizing these materials.

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