Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Environment of TiO_2 nanoparticles as an important factor to achieve highly efficiency on dye sensitized solar cells[1] TEREZA PARONYAN, M.C. LIN, DEPT. OF APPLIED CHEMISTRY, NATIONAL CHIAO TUNG UNIV. TEAM, INST. FOR PHYSICAL RESEARCH, NAAS, ASHTARAK, ARMENIA COLLABORATION, DEPT. OF CHEMISTRY, EMORY UNIV. COLLABORATION — Amorphous TiO2 nanoparticles were synthesized by sol gel technique. Environment of nanoparticles was neutralized by ammonia, and pH5.8 of TiO2 gel was achieved in result, which is close to the point of zero charge (PZC) of anatase TiO2. Highly interconnected, mesoporous, transparent films were fabricated from the TiO2 colloid with pH5.8. AFM, SEM XRD analyses were carried out for the investigation the size of nanoparticles, the surface morphology and the crystal structure of films. Volt-amperic characteristics showed an improvement in the cell efficiency along with the increasing of pH TiO2 colloid. The cells parameters (Voc, FF, Jsc, η) were studied depending on the pH of TiO2 colloid. Increasing pH of the colloid from 2.1 to 5.8 enhanced the overall conversion efficiency of the dye-sensitized solar cells by approximately 30% , and 9.2 % of efficiency was achieved with N719 dye under illumination by simulated AM1.5 solar light (100 mW/cm-2).

[1]This work was financially supported by 952001INER027 and 962001INER0029 Solar Energy Projects of Taiwan. The authors thank to Prof. A.M. Kechiantz for discussions.

Tereza Paronyan

Date submitted: 18 Dec 2007 Electronic form version 1.4