properties of ZnO-OEG NCs circumvent all the known disadvantages, which precluded its large-scale use in n-type solar applications. It is our conviction that this material surpasses the commonly used n-type TiO_2 since electrons were found to survive in the semiconductor conduction band up to seconds, which at least four to six orders of magnitude of what as been reported for classical metal oxides nanoparticles, making it a new dawn for n-type dye sensitized solar cells and solar fuel devices. It should be emphasized that this is work is on its embryonic stage and the aim of this manuscript is to show the properties of our newly sensitized water stable ZnO NCs, not device fabrication. The addition of a dye was only to show that the nanomaterial could be functionalized and probe which of the charges gets stabilized.

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Figures:

Figure 1. a) Schematic representation of functionalization of ZnO-OEG NCs with betanin; b) HRTEM micrographs of ZnO-OEG NCs; (c) size distribution of ZnO-OEG NCs in water estimated by DLS; d) optical photograph depicting adsorption of betanin on the ZnO-OEG NCs surface: *(left)* betanin in DMSO and *(right)* betanin in DMSO after addition of ZnO-OEG NCs.

Figure 2. a) Steady absorption and photoluminescence upon excitation at 355 nm of ZnO-OEG NCs in aqueous solution; b) kinetic trace at 404 nm with streak camera time-resolved fluorescence upon excitation at 320 nm of ZnO-OEG NCs in aqueous solution in insert; c) kinetic trace at 560 nm measured with nanosecond time-resolved fluorescence upon excitation at 355 nm of ZnO-OEG NCs in aqueous solution and selected spectra at different times in insert.