[0008a] According to an aspect of the invention, a photoelectric device is disclosed, the photoelectric device comprising a light-transmitting first electrode, a first semiconductor layer comprising n-type TiO_2 and in direct electrical contact with said first electrode, a second semiconductor layer in direct electrical contact with said first semiconductor layer and comprising p-type light-absorbing quantum dot nanoparticles, and a second electrode in direct electrical contact with said second semiconductor layer, said first and second semiconductor layers forming a junction therebetween, at least one side of which is substantially depleted of free electrons and of free holes when said device is not illuminated.

[0008b] According to another aspect of the invention, a nanoparticle is disclosed, the nanoparticle comprising a quantum dot core; a first shell consisting essentially of cations that substantially surround said quantum dot core; and a second shell consisting essentially of anions that substantially surround said first shell, wherein the ratio of anions to cations is approximately 1:1.

[0008c] According to another aspect of the invention, a photoelectric device is disclosed, the photoelectric device comprising a light-transmitting first electrode, a first semiconductor layer in direct electrical contact with said first electrode, a second semiconductor layer in direct electrical contact with said first semiconductor layer and comprising light-absorbing nanoparticles, each said nanoparticle comprising a quantum dot core, a first shell consisting essentially of cations that substantially surround said quantum dot core, and a second shell consisting essentially of anions that substantially surround said first shell, wherein the ratio of anions to cations is approximately 1:1, and a second electrode in direct electrical contact with said second semiconductor layer.

[0008d] According to another aspect of the invention, a method of forming passivating p-type semiconductor nanoparticles is disclosed, the method comprising the steps of (a) treating p-type semiconductor colloidal quantum dots having surface anions with a solution of a cation-containing reagent that passivates said surface anions to form colloidal quantum dots coated with a first shell consisting essentially of said cations, and (b) treating said colloidal quantum dots so coated with a solution of an anion-containing reagent that passivates said cations to form a second shell consisting essrntially of said passivating anions, wherein the ratio of passivating anions to cations is approximately 1:1.