

6. The process of claim 5 wherein the first and second solutions comprise ethanol.
7. A photocatalyst comprising:
 - a photocatalyst material comprising CdS;
 - a Ni²⁺ species; and
 - an organic ligand comprising 1,2-ethanedithiol (EDT), wherein the organic ligand attaches the Ni²⁺ species to a surface of the photocatalyst material without the formation of a dopant layer.
8. A process for producing a photocatalyst that is capable of converting H₂S into hydrogen and sulfur comprising the steps of:
 - providing a photocatalyst material; and
 - decorating the surface of the photocatalyst with a transition metal species using an organic ligand without the formation of a dopant layer, wherein the organic ligand comprises 1,2-ethanedithiol (EDT) and wherein the step of decorating the surface comprises:
 - adding the organic ligand to a first solution containing the photocatalyst material to form a first mixture having precipitates;
 - washing the first mixture with ethanol;
 - redispersing the precipitates in a second solution to form a suspension;
 - adding the transition metal species to the suspension; and
 - washing the suspension with ethanol to form a photocatalyst material having a transition metal-organic ligand species attached to a surface thereof.
9. The process of claim 8, wherein the transition metal species comprises a late transition metal species.
10. The process of claim 8, wherein the photocatalyst material comprises CdS and the transition metal species comprises Ni²⁺.

11. The process of claim 10, wherein the first and second solutions comprise ethanol.
12. The process of claim 10, wherein the transition metal-organic ligand species is a Ni-EDT species.