MECHANICALLY DEFORMED METAL PARTICLES

BACKGROUND

[0001] Photovoltaic cells, commonly known as solar cells, are well known devices for direct conversion of solar radiation into electrical energy. Generally, solar cells are fabricated on a semiconductor wafer or substrate using semiconductor processing techniques to form a p-n junction near a surface of the substrate. Solar radiation impinging on the surface of, and entering into, the substrate creates electron and hole pairs in the bulk of the substrate. The electron and hole pairs migrate to p-doped and n-doped regions in the substrate, thereby generating a voltage differential between the doped regions. The doped regions are connected to conductive regions on the solar cell to direct an electrical current from the cell to an external circuit coupled thereto.

[0002] Efficiency is an important characteristic of a solar cell as it is directly related to the capability of the solar cell to generate power. Likewise, efficiency in producing solar cells is directly related to the cost effectiveness of such solar cells. Accordingly, techniques for increasing the efficiency of solar cells, or techniques for increasing the efficiency in the manufacture of solar cells, are generally desirable. Some embodiments of the present disclosure allow for increased solar cell manufacture efficiency by providing novel processes for fabricating solar cell structures. Some embodiments of the present disclosure allow for increased solar cell efficiency by providing novel solar cell structures.

SUMMARY

[0002a] According to the first aspect, a solar cell is provided, comprising a substrate, a semiconductor region disposed in or above the substrate, and a conductive contact disposed on the semiconductor region, wherein the conductive contact includes mechanically deformed metal particles.

[0002b] According to the second aspect, a method of fabricating a solar cell is provided comprising depositing metal particles, mechanically deforming the metal particles, forming a conductive contact that includes the mechanically deformed metal particles for the solar cell.

[0002c] According to the third aspect, a solar cell is provided, comprising a substrate, a semiconductor region disposed in or above the substrate, and a conductive contact disposed on the semiconductor region, wherein the conductive contact includes mechanically deformed conductive particles.

BRIEF DESCRIPTION OF THE DRAWINGS

[0003] Figures 1A and 1C illustrate cross-sectional views of a portion of example solar cells having conductive contacts formed on emitter regions formed above a substrate, according to some embodiments.

[0004] Figures IB and ID illustrate cross-sectional views of a portion of example solar cells having conductive contacts formed on emitter regions formed in a substrate, according to some embodiments.

[0005] Figures 2A-2D, 3A-3D, and 4A-4C illustrate cross-sectional views of example sequences of forming conductive contacts, according to some embodiments.

[0006] Figures 5A-5E illustrate microscopic views of cross sections of a conductive contact, according to some embodiments.