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Simultaneous gettering and emitter formation in multicrystalline-Si wafers by annealing phosphorus doped amorphous silicon compounds

R. Ferré, I. Martín, +2 authors R. Brendel • Published 10 January 2011 •
Materials Science, Engineering, Physics • Applied Physics Letters

We demonstrate gettering of metal impurities in p-type multicrystalline silicon (mc-Si) wafers by annealing wafers that are surface passivated by double layers of amorphous silicon-based compounds acting as gettering sites. As inner layer we use a phosphorus-doped amorphous silicon-carbon-nitrogen alloy, providing surface passivation and acting as dopant source for the emitter formation during subsequent anneal. The outer layer is silicon nitride with antireflective properties. Anneals are done at 750, 800, and 850 °C for 30 and 60 min. The gettering effect is as good as for a conventional POCl3 diffusion followed by extended gettering at low temperature, and it is weakly influenced by the temperature step chosen. In the range explored, the sheet resistances of the emitters and the junction depths lay between 3000 to 60 Ω/sq. and 100–300 nm, respectively. Collapse

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