GLOW DISCHARGE AMORPHOUS SILICON FOR PASSIVATION LAYERS

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Beside the well known application for solar cells, amorphous silicon deposited by silane decomposition in a glow discharge seems to be a very interesting material for the passivation of semiconductor components.

The moderate gas pressure during deposition ensures an excellent edge coverage, the almost ideal density of the films leads to a good humidity protection. The electrical conductivity of the glow discharge silicon may be easily adjusted by the deposition parameters to yield a semi-isolating behaviour. The deposition temperature is relatively low (100°C to 300°C) because of the plasma induced dissociation of the reaction gas.

The hydrogen which is incorporated in the amorphous silicon film may be responsible for positive interface states which distort the space charge of underlaying pn-junctions. On the other hand the hydrogen may diffuse from the amorphous film in the underlaying crystalline component thus compensating and reducing the crystalline surface states which are of primary importance for MOS technology.