Direct Metallization on Silicon

nb technologies
consulting engineers

NB sunNiSi 100 is a **silicon porosification** process followed by a **nickel** electroplating **process from a single bath**. The process is used for **direct plating on silicon** without the need of dedicated seed layers. This is useful for **backside-contacting scenarios**.

The same electrolyte solution is used while the electrical contacts are swapped after the porosification. Major purpose is to fill porous silicon with nickel. The plating process produces a pure, ductile, fine-grained, semi-bright, low stress nickel deposit. NB sunNiSi 100 is applied for porosification and electroforming of microstructured wafers (micro system technology) and solar cell front side contacts.

Process

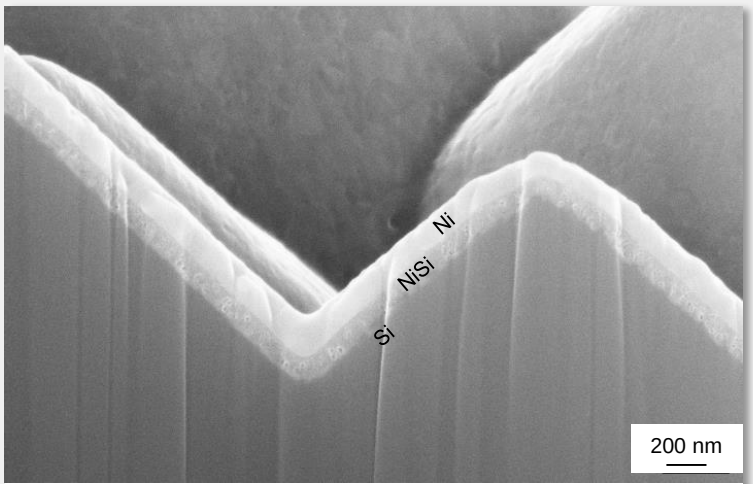
- Porosification of silicon (well controlled, homogeneous thickness), silicon substrate: anode
- Electroplating of nickel into the pores, silicon substrate: cathode
- Nickel serves as seed layer for further metallization by electroplating
- Silicidation at 300°C for permanent adhesion and reduced contact resistance

Application in MST and ME

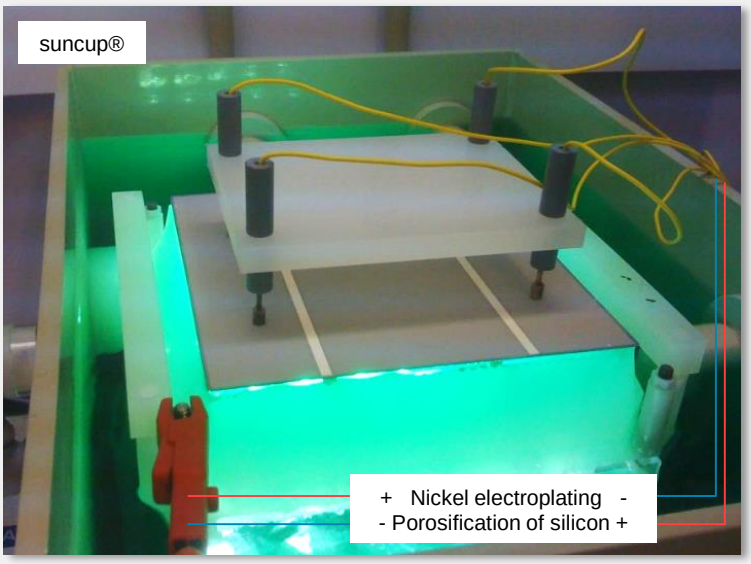
- **Direct metallisation on silicon**
- Magnetic actuators: NiFe on NiSi seed
- Ni/Cu/Sn on Si for bump metallization
- Copper conductors on doped silicon

Application in Solar Cell Manufacture

- Avoid short-circuits of emitter (200 nm) in NiSi formation process
- NiSi limited to porous silicon layer thickness lower than 100 nm
- Light assisted plating using photocurrent



Textured silicon with <50 nm homogeneous nickelsilicide processed as sunNiSi and electroplated nickel layer on top.



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