# Two birds with one tool: using thermocompression for both metallic contact annealing and wafer bonding of GaAs solar cells

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Thermalization is a phenomenon occuring in solar cells when the excess energy absorbed from the solar spectrum is converted into heat. This causes the solar cell to heat up and hence reduces its conversion efficiency [1]. One way to minimize the impact of the thermalization, by efficiently extracting the heat from the cell, is to attach the PV cell onto a substrate with high thermal conductivity [2].

Beyond thermal issues, good electric contacts are also required to get efficient solar cells. In the frame of the integration of solar cell with thermoelectric converters (ANR HYDRES project), we study the problematics of bonding a GaAs solar cell onto an heat sink metal substrate. The backside electrical contacts of the GaAs solar cells are usually composed of AuGeNi/Au or Ti/Pt/Au alloys depending on the doping type (N or P) [3], both of them requiring thermal annealing to improve their contact resistances (i.e getting ohmic contacts). We propose here an original approach by using thermocompression to enable to simultaneously bond the cell with its host substrate and get ohmic contact through thermal annealing. While thermocompression uses high temperature and pressure to create a Au-Au interdiffusion ensuring a good wafer bonding, the temperature required is high enough for contacts annealing.

We will present the bonding process of a GaAs solar cell to the host copper wafer while ensuring ohmic contacts behaviour. We will discuss the impact of the parameters used during the thermocompression step, such as the heating time, the temperature ramping and the applied pressure. We plan also to investigate the impact of the thermocompression step on the interface composition and surface roughness.

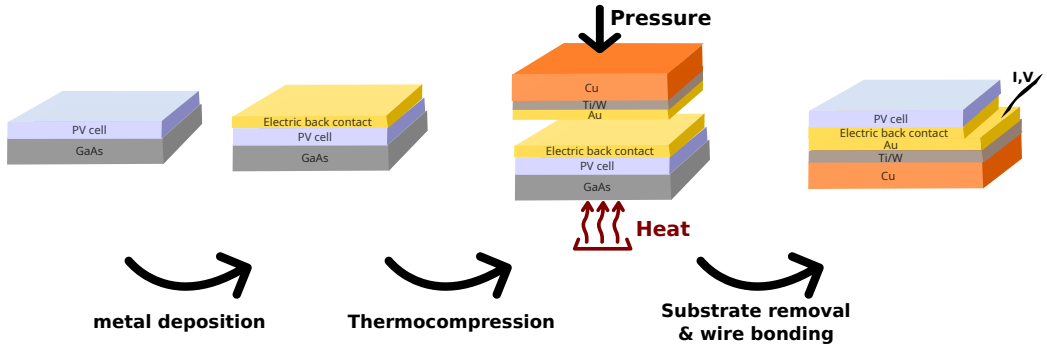


Figure 1: Schematic of the planned process flow to transfer a GaAs photovoltaic cell from the growth substrate to a copper host substrate.

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# References

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