Role of boundaries during wetting and diffusion interaction of heterogeneous metals

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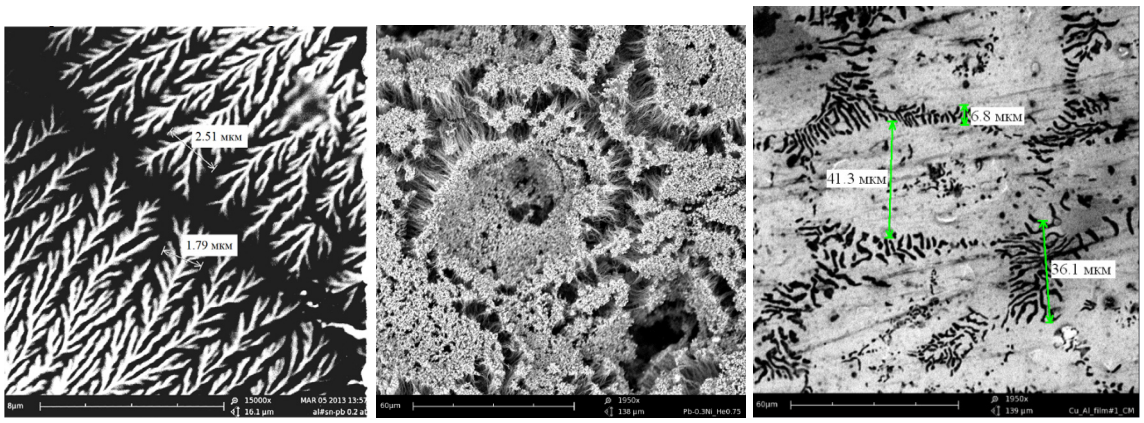
Grains Boundaries in metals render essential agency, both on diffusion interactions of heterogeneous metals, and on processes of wetting by fluid melts of a surface of metal substrates.

So at wetting in vacuum 0.01 Pa an aluminium substrate by stannous at temperature more than 900 K observes a threshold of wetting, small additives of lead to stannous downgrade temperature of a threshold of wetting.

Prior to the beginning of wetting prestress distribution of solder along microscores and boundaries of grains of aluminium is observed. The atoms which are taking place on these boundaries, have an excess energy, therefore at high temperatures probably livelier dissolution of grain boundaries in a melt along which the stannic melt prestressly spreads out. Thus solder dissolves intense sections of boundaries of grains, or enters contact melt with aluminium, and then crystallized as arborescent structures of micrometer gauge (see figure 1*a*).



a *b* *c*

Figure 1. *a* - the Substrate of aluminium wettable with melt Sn-0.6 ат. % Pb, 15000×;
b - Morphology of a surface of nickel sheet NP-2 near to a drop of melt Pb - 0.3 ат. % Ni, 1950×;
c - the Photo of a granular structure on film Cu/Al, 1950×

The analogous effect is observed at wetting by melt Pb-0.3 at. % Ni in vacuum 0.02 Pa surfaces of nickel of brand NP-2.

Studying morphology of a surface of sheet NP-2 after wetting (near to a drop) along boundaries of grains growth of fibrous structures has been observed (see figure 1*b*).

The role of boundaries of grains is manifested at diffusion interaction of heterogeneous films, for example films Cu/Al, which are vapor-deposited on optical glasses of brand C8 which were soaked at temperature 560°C too.

On separate sections of film Cu/Al the structure is consists of grains. Eutectic formations are observed along boundaries of grains (see figure 1*c*). The provisional size of grains is 41.3 microns.