Hybrid solder joints: the effect of nano-sized Ni and ceramic admixtures on morphology and shear strength of Sn-5.0Ag solder joints

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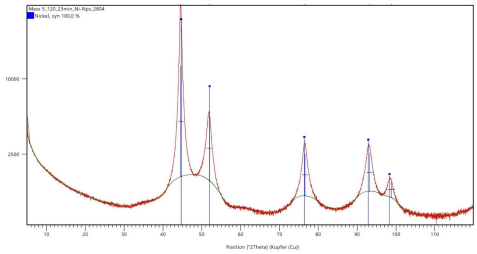
main area of interest

the concept of hybrid solder joints is a promising approach to improve the mechanical reliability of lead-free solder joints.

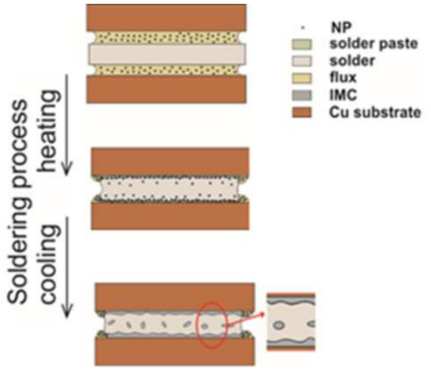
performed study

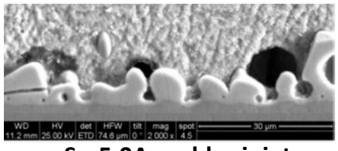
synthesis of Ni NPs → **production of solder joints** → **studies of the joints**

Ni nanoparticles (NPs) have been produced via a chemical reduction method employing hydrazine hydrate ($N_2H_4 \cdot H_2O$) and polyvinylpyrrolidone (PVP) as reducing and surfactant agents, respectively. Nickel chloride ($NiCl_2$) was dissolved in diethylene glycol (DEG) as the metal precursor.

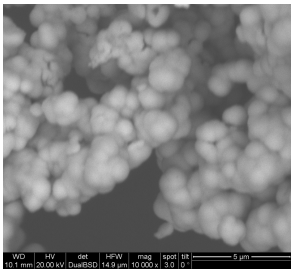


XRD of the produces Ni NPs

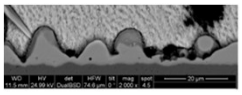




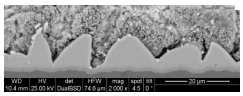
Sn-5.0Ag solder joint



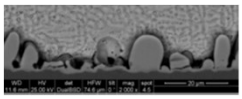
SEM of the produces Ni NPs



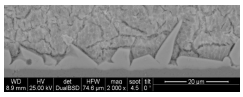
$(Sn\text{-}5.0Ag)_{99.8}Ni_{0.2}$



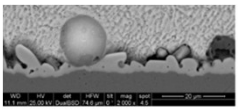
$(Sn\text{-}5.0Ag)_{99.8}(TiO_2)_{0.2}$



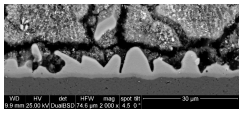
$(Sn\text{-}5.0Ag)_{99.5}Ni_{0.5}$



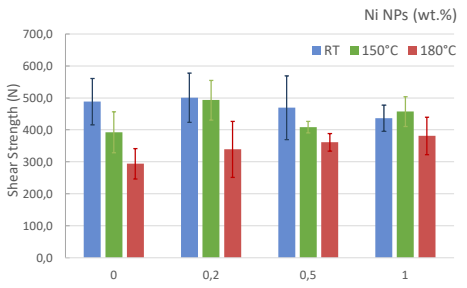
$(Sn\text{-}5.0Ag)_{99.5}(TiO_2)_{0.5}$

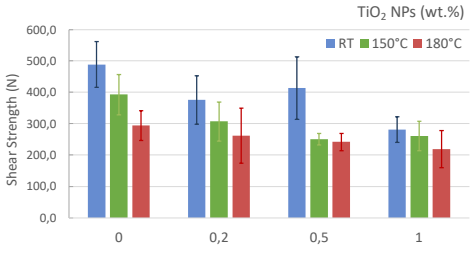


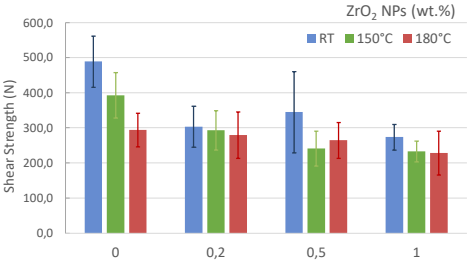
$(Sn\text{-}5.0Ag)_{99.0}Ni_{1.0}$



$(Sn\text{-}5.0Ag)_{99.0}(TiO_2)_{1.0}$







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