

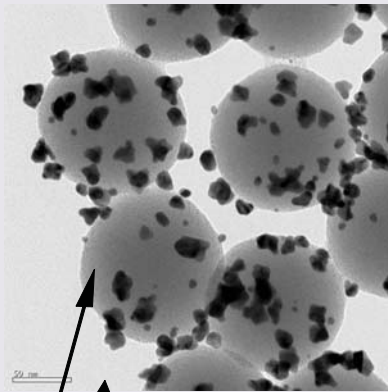


### Microemulsion Fabrication of Nanoparticles for Enhanced Solder Materials

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This feasibility study aims to explore the possibility of using microemulsion techniques to produce tailored nanoparticles for use in nanocomposite solder materials with enhanced properties. Nanocomposite solders are being examined in several laboratories world wide because of their improved creep resistance, but the additional functionality that can be added using emulsification techniques to produce the nanoparticles has yet to be explored. In particular, the use of nanoparticles to release reactive elements into the solder will be investigated. In addition, the project will explore the possibility of replacing traditional 10 micron+ sized particles in a solder paste, with nanoparticles of solder, complete with noble metal or organic anti-oxidant coatings, resulting in a step change in solder paste technology, potentially eliminating the main causes of solder paste printing and reflow defects. The work fits in well with the aims of the DTI Electronics 2015 report because it enhances the UK capability in manipulated materials properties at the nanotechnology level, by combining UK expertise on microemulsions with expertise on modelling and electronics assembly materials.

Partial Coating

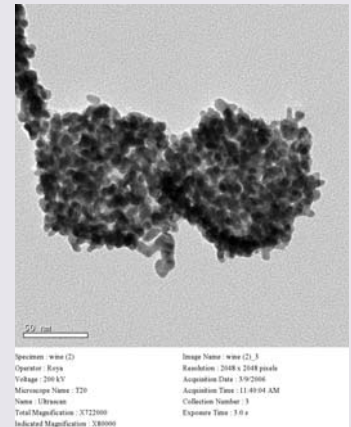


silica nanoparticle

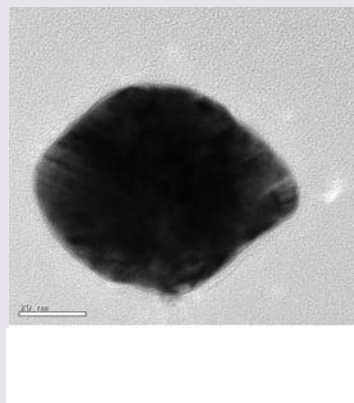
Au



Near complete coverage



Specimen: wire (2)	Image Name: wire (2)_3
Operator: Keys	Resolution: 2048 x 2048 pixels
Voltage: 200 kV	Acquisition Date: 9/9/2008
Microscope Name: J20	Acquisition Time: 11:49:04 AM
Name: I. Ubrayev	Collection Number: 3
Tool/Modification: XT22000	Exposure Time: 3.0 s
Indicated Magnification: X80000	



Fully Au coated silica nanoparticle