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Electrokinetics and Stability of Solder Powders in Aqueous Media

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Abstract : Solder pastes are widely used in creating mechanical, thermal and electrical connection between electronic components. Continued miniaturization of consumer electronics drives manufacturers to achieve smaller, lighter, and faster electronic packages at low cost. This faces them to the difficult challenge of dispensing solder pastes in extremely precise and repeatable manner. The most common problem in solder paste dispensing is the clogging of dispensers which results from agglomeration and settling of solder powders leading to increase on the effective particle size and uneven distribution of particles in the mixture. In this work, microelectrophoresis was employed to investigate the effect of pH and KNO_3 concentration on the electrokinetic behavior and stability of SAC305, PbSn5Ag2.5 and Sn powders in aqueous media. Results revealed that the electrokinetic behavior of the three types of solder powders are similar, which was attributed to high SnO_2 content on the surface of the particles. Electrokinetic measurements showed that the zeta potentials of the solder powders are highly dependent on pH and KNO_3 concentration with isoelectric points ranging from 3.5 to 5.5. Results were verified using stability tests.

Keywords : electrokinetic behavior, isoelectric point, solder powder, stability, surface analysis
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