

Low and high temperature isothermal aging effect on morphology and diffusion kinetics of intermetallic compound (IMC) for Sn-Cu-Si₃N₄ composite solder

Abstract

The effect of excessive intermetallic growth to the reliability of solder joints become major problem in electronic devices industry. In this study, we used Sn-Cu-Si₃N₄ composite solder to observe the intermetallic compound (IMC) growth during low and high temperature aging. 50°C and 150°C represent low and high aging temperature respectively. Various isothermal of aging times were carried out by using 24hrs, 240hrs and 720hrs. The IMC thickness increases with increasing of aging temperature and time. Cu₆Sn₅ phase appear at low aging temperature whilst Cu₆Sn₅ together with Cu₃Sn phases has been observed at high aging temperature. The growth kinetics for low and high aging temperature is $1.63 \times 10^{-18} \mu\text{m}^2/\text{s}$ and $2.75 \times 10^{-18} \mu\text{m}^2/\text{s}$.

Keywords; Growth Kinetics, Intermetallic, Ostwald Ripening