purity Cu. Addition of La<0.002wt%, Ce<0.003wt%, Ca<0.004wt% to a 4N Cu wire revealed a long storage life.

Generally, doped Cu wires are in demand with good bondability, free air ball formation in an inert or reactive environment, reliability, in particular under highly accelerated stress test (HAST), good looping performance and easy to wire draw in mass production scale properties. Slight increase in the resistivity by 5-15% is typically the disadvantage of doped Cu wires. However, if the wire exhibits superior reliability performance especially under HAST, the wire is attractive even with increased resistivity and cost.

Example embodiments of the present invention seek to provide doped 4N Cu wires for bonding in microelectronics that can provide high reliability performance with reduced compromises in other properties.

SUMMARY

According to a first aspect of the present invention there is provided a doped 4N copper wire for bonding in microelectronics comprising one or more of a group of Ag, Ni, Pd, Au, Pt, and Cr as corrosion resistance dopant material, wherein a concentration of said corrosion resistance dopant material is between ~~about~~ 10wt.ppm and ~~about~~ 80wt.ppm~~.~~, and wherein the doped 4N copper wire remains as 4N after being doped with said corrosion resistance dopant material.

The corrosion resistance dopant material may comprise about 10wt.ppm to about 80wt.ppm of Ag.

The corrosion resistance dopant material may comprise about 10wt.ppm to about 80wt.ppm of Ni.

The corrosion resistance dopant material may comprises about 10wt.ppm to about 80wt.ppm of Pd.