

## 摘要

本研究主要是改變銅合金的材料參數觀察其抗菌、抗腐蝕的影響，材料的參數包含成分、晶粒尺寸、伽凡尼電偶、析出物以及表面粗糙度。

研究結果顯示增加銅含量可以提升殺菌率。純銅和不銹鋼形成的伽凡尼電偶可促進更多的銅離子釋出進而提升殺菌率。

晶粒尺寸的減少可以使材料達到更好的抗菌表現但抗腐蝕能力也相對下降。Corson70250 是一種析出強化型的銅鎳矽合金，鎳矽化合物的析出可以強化整體結構強度，而經過固溶處理和析出處理可以控制析出物的多寡。研究發現越多的析出物可以增加基材本身的銅含量使得抗菌能力提升。最後，表面粗糙度的增加也會提升抗菌表現，因為整體表面積的增加以及粗糙度大的材料具有較低的功函數使得電子較容易釋出。



# Abstract

The present article investigates material parameters that affect performance of the antibacterial properties and the corrosion resistance of the copper and the copper alloys. These parameters include the composition, grain size, galvanic coupling, precipitations and the surface roughness.

Experimental results indicate the increased in copper content can increase the bacterial killing rate (BKR %). Galvanic coupling between Cu-stainless steel can enhance the copper ion release so that antibacterial ability can be improved.

Smaller grain size renders the material better bacterial killing rate during initial exposure but with poor corrosion resistance. Corson70250 is a precipitation strengthened Cu-Ni-Si alloy, which can be strengthened by the fine precipitation of Ni-Si compounds; these phases can increase the copper matrix to result higher BKR%. Finally, the degree of the surface roughness increased, it had the better antibacterial ability since the contact area increased and the rougher surface had the lower electron work function which have easily tendency to escape the electrons.