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国外声学简讯

7.5MHz声-喷注镀金和铜

R. J. von Gutfeld 等人报道, 以 7.5MHz 的聚焦声通过喷射器中心对基片镀金或铜, 与单独的喷镀技术比较, 在声场作用下, 改善了金和铜镀层的电积结构。对两种方式喷镀的样品做扫描电子显微检查发现, 有声场作用时, 镀层具有较为致密的电积, 有更为密集的柱状晶生长结构。而没有加声的镀层, 其镀层结构较疏松, 有枝蔓状晶生长。经测量, 声-喷注镀铜线与不加声的喷镀铜线比较, 其电阻率降低 10—50%, 最低的电阻率约为 $1.7\mu\Omega$, 等于铜的体积电阻。

声-喷注镀金属装置如图所示。电解液从直径为 0.5—1mm 的喷口射出, 其速度约为 350—1000m/s。提供水压的泵与电解溶液的容器相连, 溶液在密封的系统中循环。阳极与阴极(被镀样品)之间由一个恒流源保持一电位差。样品连接到由计算机控制的活动臂上, 使在喷射器与阴极之间作指定的相对运动。声换能器是一个 PZT 薄球面壳, 其曲率半径为 2.5cm。射频功率放大器供给换能器的连续电功率可达 12W; 射

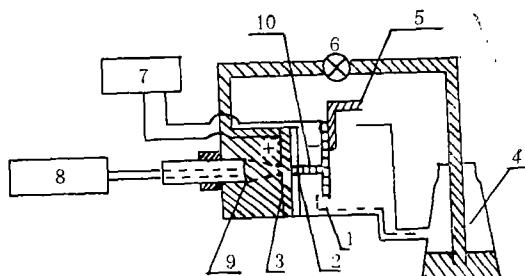


图 声-喷注镀金属实验装置示意图

1.阴极; 2.喷口; 3.阳极; 4.电解液槽; 5.至计算机控制; 6.泵; 7.电流源; 8.射频发生器; 9. PZT 换能器; 10.喷射器。

到样品的声通量估计最大为 $30W/cm^2$.

(刘献铎)