

技术及应用

### 磁控溅射制备纳米厚度连续金膜

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**摘要** 研究了磁控溅射工艺参数对Au膜生长速率、表面粗糙度和微观结构的影响。结果表明: 当溅射功率低于200 W时, 溅射功率对薄膜表面粗糙度、微观结构的影响不明显。标定了溅射功率为20 W条件下的Au膜生长速率, 观察了Au的生长过程, 在Si基底沉积的Au为岛状(Volmer-Weber)生长模式, Au膜厚度为8 nm时, 薄膜开始连续。晶粒尺寸与薄膜厚度的关系研究结果表明: 在生长初期, 晶粒尺寸随厚度线性增大; 随后, 晶粒尺寸增速变缓, 直至停滞; 趋于70 nm时, 新晶粒形成取代晶粒长大。

**关键词** [磁控溅射](#) [表面粗糙度](#) [纳米Au膜](#)

分类号

### Preparation of Continuous Gold Nano-films by Magnetron Sputtering

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**Abstract** Gold nanometer films were deposited on Si substrates at different condition by magnetron sputtering. Influences of the sputtering power on film growing rate, surface roughness, microstructure were investigated. The influences were neglectable for sputtering power below 200 W. Film growing rate under 20 W was accurately calibrated, and the evolution process of gold film was observed. It shows that the growing model of gold film on Si substrates is Volmer-Weber growth. Films become continuous when thickness reaches 8 nm. At growing early stage of gold film, relationship between grain size and film thickness is linear. Speed of grain growth become slow until stagnation. Grain growth is replaced by new nucleation when grain sizes reach 70 nm.

**Key words** [magnetron sputtering](#) [surface roughness](#) [nano-gold film](#)

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