

## ICP刻蚀硅形貌控制研究

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摘要：

硅的刻蚀形貌控制是MEMS器件加工中的关键技术之一，形貌控制是硅表面刻蚀和钝化反应取得平衡的结果，任何影响刻蚀和钝化反应的因素都会影响到刻蚀形貌。采用中科院微电子研发中心研制的基于化学平衡原理的ICP-98A等离子刻蚀机，对ICP刻蚀当中影响形貌的关键工艺参数进行了研究和分析，研究了源功率RF1、射频功率RF2及气体(SF6和C4F8)比例对刻蚀形貌的影响，分析了bowing现象产生机制，并给出了降低这种现象的工艺方法。该研究对提高硅的ICP刻蚀形貌控制具有重要的指导意义。

关键词：ICP刻蚀 硅 形貌控制 bowing效应 工艺参数

## Effect of Process Parameters on the Morphology of Silicon Structures After ICP

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**Abstract:**

Morphology control of silicon etching is one of the key technologies in fabrication of MEMS devices, which is a accurate balance between surface etching of silicon and the passivation reaction; any parameter that affects these previous two issues would have an effect on the final morphology The key process parameters that can affect morphology during the ICP etching process were studied and analyzed, based on ICP etching machine (ICP-98A) using chemical equilibrium principles, manufactured by the Microelectronics R&D Center, CAS. The affect on etching morphology by the source power RF1, radio frequency RF2 and gas ratio (SF6 to C4F8) were researched. The appearance of Bowing phenomenon were analyzed and the fabrication methods were given to reduce the phenomenon. This research has an significant guiding effect to the study of improving morphology control by silicon ICP.

**Keywords:** ICP Etching ;silicon; morphology control; bowing effect; technique parameter

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