

## 산소 플라즈마 식각 방법을 이용한 나노미터 규모의 금속 전극 제작

김경섭<sup>1</sup>, 노용한<sup>1,2</sup>

<sup>1</sup>성균관대학교 정보통신공학부, <sup>2</sup>성균나노과학기술원(SAINT)

Noble nano- and bio-electronic devices require the formation of metal electrodes with nanometer-scale gaps. Recently the fabrications of metal electrodes with a nano gap dimension have been demonstrated by using advanced techniques such as electron-beam lithography, focused ion beam lithography, or photolithography. Special techniques such as electromigration-induced break junction, shadow deposition, or electrochemical deposition are used to reduce the gap between two metal electrodes after patterning pads and electrodes with a conventional photolithography. However, most of this methods is generally very slow, complicated, and expensive. Furthermore, electrodes formed by the previously suggested methods are not suitable to mass production.

We report a reliable and reproducible method to fabricate nanometer-scale gaps between two metal electrodes. The techniques used in this work are a conventional photolithography, where specifically designed photomask and lift-off methods were used, and a plasma downstream ashing. We have demonstrated that the gaps between two metal electrodes decreased up to about 14 nm. In practice, the nanometer-scale gap less than 10 nm can be easily realized. Our suggestion method is simple, inexpensive, fast, and suitable to mass production.