Supplementary Material (ESI) for Lab on a Chip

Supplementary information for

Nanostructured biosensing platform-shadow edge lithography for high-throughput nanofabrication

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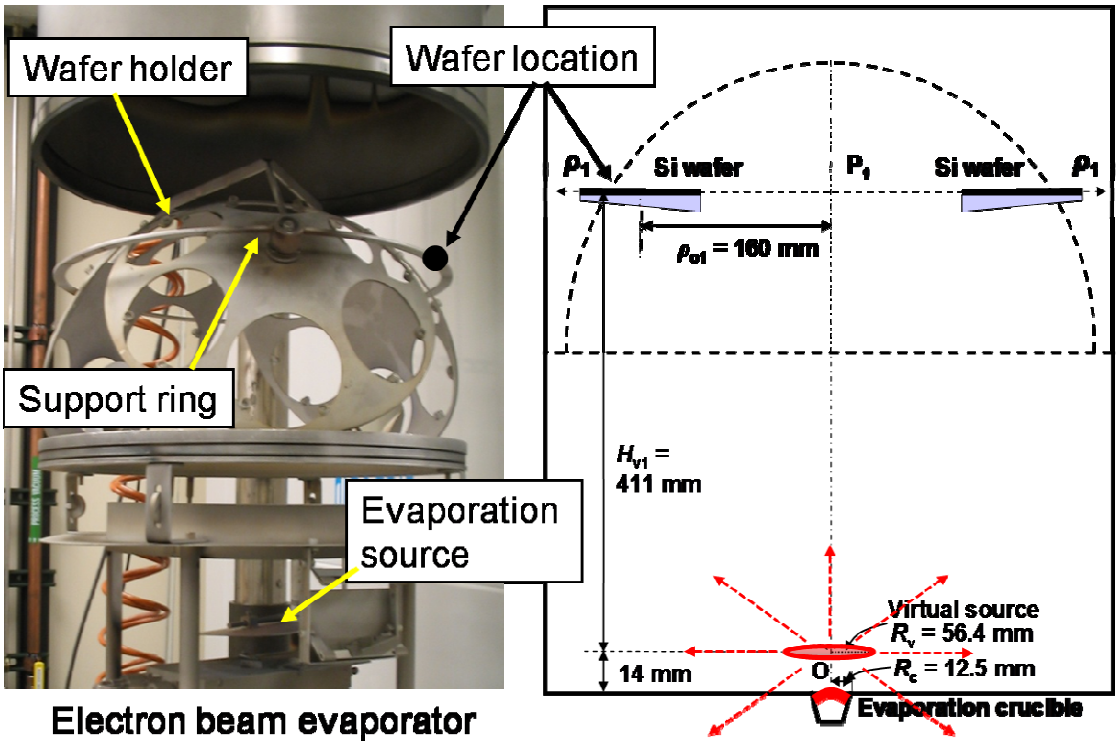
Geometry of an electron beam evaporator and the locations and angles of wafers for the first and the second evaporation

Fig. 1 shows the electron beam evaporator (NRC 3117, Varian Inc., Palo Alto, CA) used in this experiment. In the vacuum chamber, an evaporation source and a wafer holder are located as shown in Fig. 1. Since this evaporator is originally designed for film deposition of a uniform thickness, the wafer holder can be rotated for continuous variation of angles and locations (i.e. conformal deposition). For the compensation of the gap sizes, however, the wafer holder is not rotated in the first and the second evaporation (i.e. non-conformal deposition).

For the first Al deposition, wafers are clamped on the support ring by a clip in order to maintain the angle sketched in Fig. 1(b). Since the wafer holder is not rotated during the

evaporation, an Al layer of nonuniform thickness is deposited. The locations and angles of the wafers are sketched in Fig. 1(b).



(a) (b)

Fig. 1. Electron beam evaporator and the locations and angles of wafers for the first Al deposition. (a) picture of the chamber; wafer holder is composed of three wheels having 100 mm wafer slots and a support ring (b) side view of the locations and angles of wafers.

Regarding the second Al deposition, wafers are loaded on the top slot of the wheels in the wafer holder. The locations and angles are sketched in Fig. 2. As shown in Fig. 1 and Fig. 2, the combinations of the locations and angles are limited by the geometry of the wafer holder in our experiment. In this chamber, three wafers can be loaded for the first and the

second Al depositions. Using a wafer holder capable of adjusting locations and angles, a larger number of wafers can be loaded with more precise control over the compensation of the fabricated nanogap sizes.

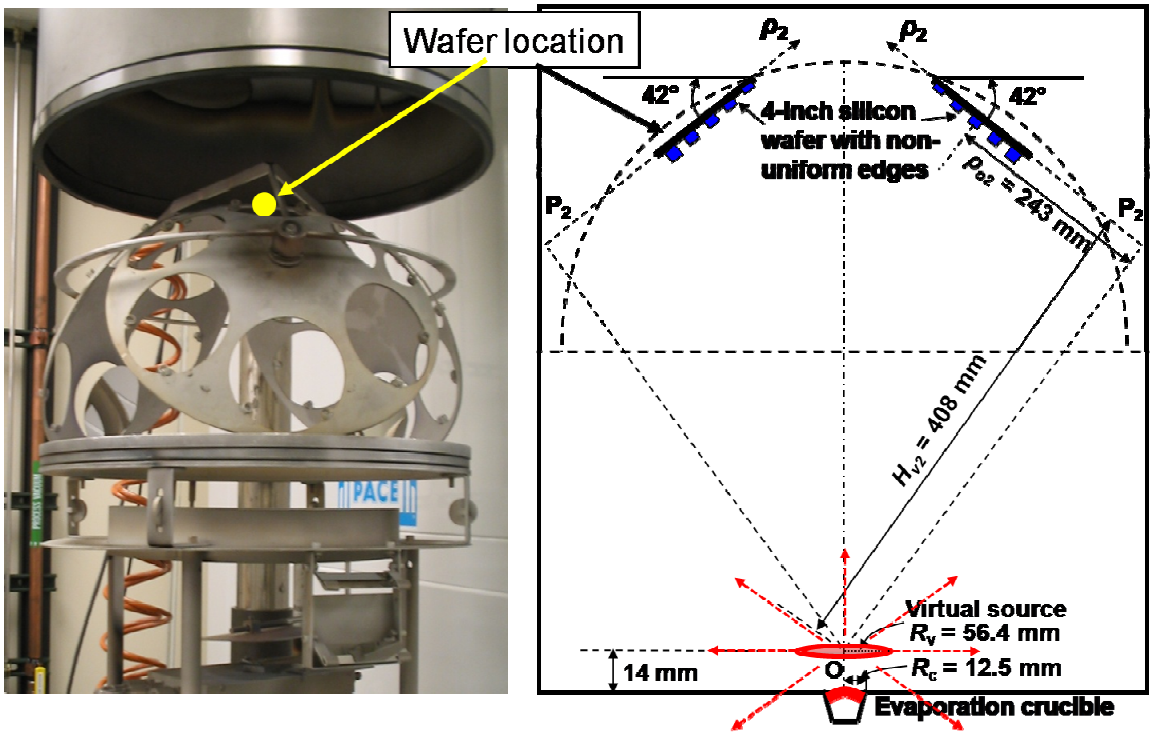


Fig. 2. Electron beam evaporator and the locations and angles of wafers for the second Al deposition. (a) picture of the chamber and the location of a wafer indicated by an arrow (b) side view of the locations and angles of wafers.