

# **Facile fabrication of ultrathin graphene film with ultrahigh electrical conductivity and superb electromagnetic interference shielding effectiveness**

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### ● A brief description on the measurement method for the film thickness

In order to obtain the accurate result of film thickness, the following measurement procedures has been used:

Firstly, the as-prepared graphene film was cut into a small slice with a dimension of  $1 \times 0.5 \text{ cm}^2$ , and then fixed vertically on the sample stage with conductive adhesive for the SEM observation (schematically shown in Fig. 1).

Then, the film thickness measurement was performed under SEM observation. During which, the position of the sample stage was carefully and continuously adjusted to control the angle between the electron beam and the cross section of the film sample. Once the electron beam was perpendicular to the cross section (schematically shown in Fig. 1), the position adjustment of the sample stage was finished, and the cross-sectional morphological image was taken at this moment. Eventually, the film thickness was obtained by carefully measuring the width of the cross section on the resultant SEM image. For accuracy, the value of film thickness was determined by averaging the measurement data obtained from 5 different cross-section positions.

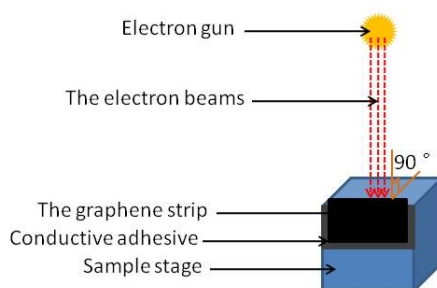


Fig. 1 The schematic diagram of SEM measuring film thickness.

- [1] W. X. Yang, Y. C. Gong, X. F. Zhao, T. Y. Liu, Y. Y. Zhang, F. Chen, Q. Fu, *ACS Sustainable Chem. Eng.*, 2019, **7**, 5045-5056.
- [2] X. L. Zhao, W. Q. Yao, W. W. Gao, H. Chen, C. Ga, *Adv. Mater.*, 2017, **29**, 1701482.
- [3] P. Kumar, *Adv. Mater. Interfaces*, 2019, **6**, 1901454.