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Study on the helium permeability of graphene oxide membranes for leak testing

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As the development of electronic technique and miniaturization of vacuum electronic devices, it has higher demands for their lifetime and reliability. In order to meet the sealing performance requirements, extra-high sensitive mass spectrometer leak detection method is developed. So the leak rate of $10\text{-}15\text{Pa}\cdot\text{m}^3/\text{s}$ on the order of the standard leakage is demanded. Increasing the number of holes in the graphene on the artificial control, the leak rate of graphene would be improved. Based on this idea, a certain defective graphene as a penetrating element, using in the ultra-sensitive leak detection can be made. In this paper the relationship among the permeability of helium and the pressure difference and the thickness of the GO membrane were studied. The permeation mechanism of GO membrane of the minimal leak rate was discussed, which provides a reference for the study of ultra-sensitive leak detection technology.

Primary author: REN, Guohua (Beijing Institute of Spacecraft Environment Engineering)

Co-authors: Prof. DONGHUI, Meng; Prof. RONGXIN, Yan; Dr LINA, Wang; Mr CHONGWU, Guo; Mr ZHENG, Li

Presenter: REN, Guohua (Beijing Institute of Spacecraft Environment Engineering)

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