



Contribution ID: 88

Type: Oral

Giant rectification effect in PET suspended graphene nanopore

Monday, 18 May 2015 15:20 (20 minutes)

Graphene is an ultimate thin membrane with carbon atoms arranged in a honeycomb lattice and extra high mechanical property. Introduced nanopores in graphene can be used in water desalination technologies because of high efficiency in rejecting salt ions. Here, swift heavy ion was used to prepare single nanopore in monolayer graphene which was transferred to PET membrane. After asymmetric etching of irradiated PET membrane, the PET suspended graphene nanopore can be obtained and used to carry out the ionic transport study. In order to investigate the rectification effect of suspended graphene nanopore, three electrolytes with monovalent cations LiCl, NaCl and KCl are chosen for current-voltage measurement, respectively. Obvious rectification effect was confirmed in the electrolytes of KCl and the rectification ratio can be adjusted by varying the concentration and pH value of KCl solutions. The giant rectification ratio of 190 was observed in 0.02 M KCl with the pH value of 2.

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Session Classification: Session 3

Track Classification: 09 - Ion-track technology