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IUPAP Award: Ion transport in 2D materials

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Intercalation in 2D materials drastically influences both physical and chemical properties, which leads to a new degree of freedom for fundamental studies and expands the potential applications of 2D materials. In this talk, I will discuss our work in the past two years related to ion intercalation of 2D materials, including insertion of Li and Na ions in graphene and MoS2. We focused on both fundamental mechanism and potential application, e.g. we measured in-situ optical transmittance spectra and electrical transport properties of few-layer graphene (FLG) nanostructures upon electrochemical lithiation/delithiation. By observing a simultaneous increase of both optical transmittance and DC conductivity, strikingly different from other materials, we proposed its application as a next generation transparent electrode.