

Investigation of electric double layer at liquid interface with TOF-MEIS

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The presence of electric double layer (EDL) at liquid interface has been recognized for last 100 years but the atomic scale structure of EDL has not been revealed, even though optical or electrical techniques could monitor the change of EDL. Most of atomic scale surface and interface analysis techniques are based on vacuum so that liquid interfaces can be hardly investigated.

We designed an ultra high vacuum compatible liquid cell with a single layer graphene window so that MEIS analysis can be applied to the graphene liquid interface. We clearly observed the EDL structure formed between CuO and KI solution showing I accumulation and K depletion at the EDL with the width of ~1 nm.

Studies on systematic dependence of EDL structure on the bias voltage and electrolyte concentration are in progress. Preliminary results on EDL structure profiling and further prospective on bio-liquid interface, protein adsorption, and artificial cell membrane structure will be reported for discussions and comments