

## Surface Functionalization of Ionovoltaic Energy Conversion Device for Monitoring Ion-specific Adsorption at the Solid-liquid Interface

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Aqueous ion-solid interaction has been actively studied in diverse research fields. However, a detailed understanding of electric double layer (EDL) and the interaction at the EDL still remains in a poor level due to specific interfacial conditions and a complexity of an observation. Recently, an energy conversion device using a dynamic water motion (called ionovoltaic device) has been highlighted not only as an energy harvesting system but also as a novel monitoring technique of the solid-liquid interface. Herein, specific adsorption of biologically harmful heavy metal ions ( $\text{Cu}^{2+}$  and  $\text{Pb}^{2+}$ ) at the solid-liquid interface was monitored using surface-functionalized ionovoltaic energy generating device. The device showed selective variations of the generated voltage for  $\text{Cu}^{2+}$  and  $\text{Pb}^{2+}$  even in a mixed solution. Interfacial potential variation by the specific adsorption was investigated for elucidating a working mechanism of the device. The experimental results can give a novel method of probing molecular-level ion-solid interactions with the simple and cost-effective device. This approach can extend the understanding of the ion-surface interactions at the EDL.