Fall AVS abstract. Session CA6: Novel Developments and Applications of Interfacial Analysis

Title: Applying *in situ* bias during TOF-SIMS analysis to investigate ion migration in perovskite devices

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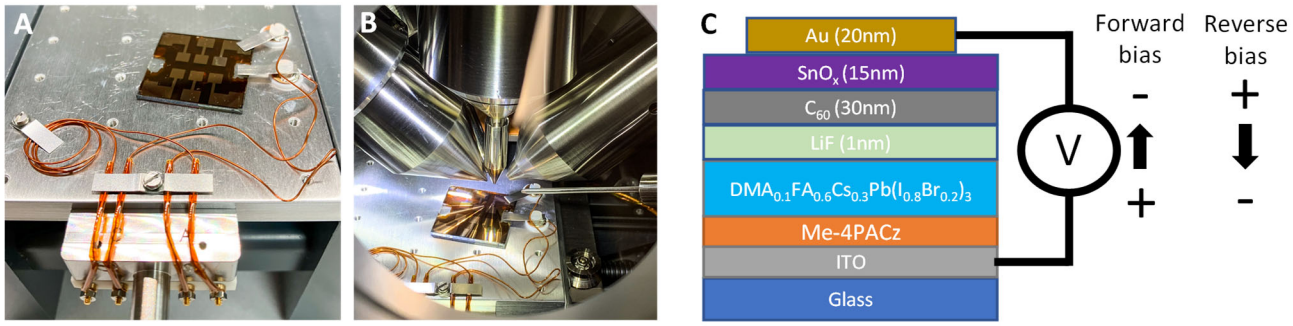

Fig. 1. A) Photo of a sample on the holder prepared for *in situ* bias. Only two of the four leads on the holder are used. A Teflon washer and screw isolate the wire (soldered to a metal washer) from the holder itself. The lower clip is contacting the ITO, and the upper clip is contacting the gold. B) Photo of the sample under bias inside the measurement chamber. The primary ion gun is at left, the detector extraction cone is in the center, and the sputter gun is at right. C) Schematic of the device stack and definition of the forward and reverse bias conditions.

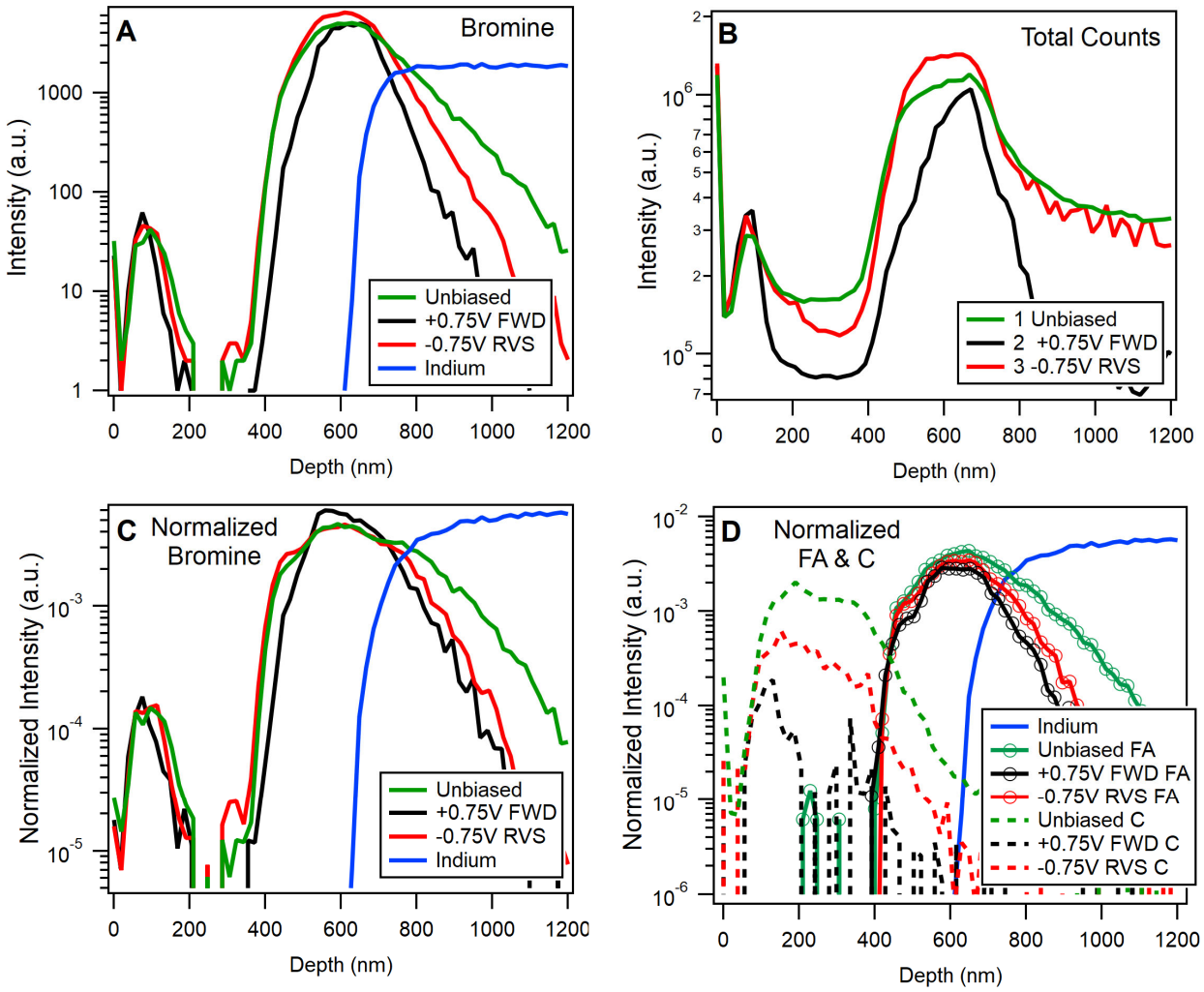

Fig. 2. A) Bromine profiles from the same sample ($Cs_3Br_2^+$ ion cluster). First, the unbiased profile was taken (green online); second, the +0.75 V forward bias was applied (black online), and the onset of the bromine trace appears closer to the ITO; last, the -0.75 V reverse bias was applied (red trace), and the bromine again overlaps with the unbiased. B) Total counts measured for the three profiles. C) Data from A, now point-to-point normalized with the total counts in B. D) Formamidinium (FA) profiles (solid lines with circular datapoints) and carbon signal (dashed lines - reflective of the C_{60} layer) for the three profiles. Little change in the FA is noted, conversely the carbon signal deceases with each bias experiment. A single trace for the indium is shown in all plots (blue online) to indicate the presence of the back contact; beyond ~700 nm, the SIMS data become unreliable due to roughness artifacts.