

Figure S1. SEM images of a MAPI surface (a) and MASI surface (b). The cracks between the grains of the MAPI sample are caused by the exposure to the electron beam.

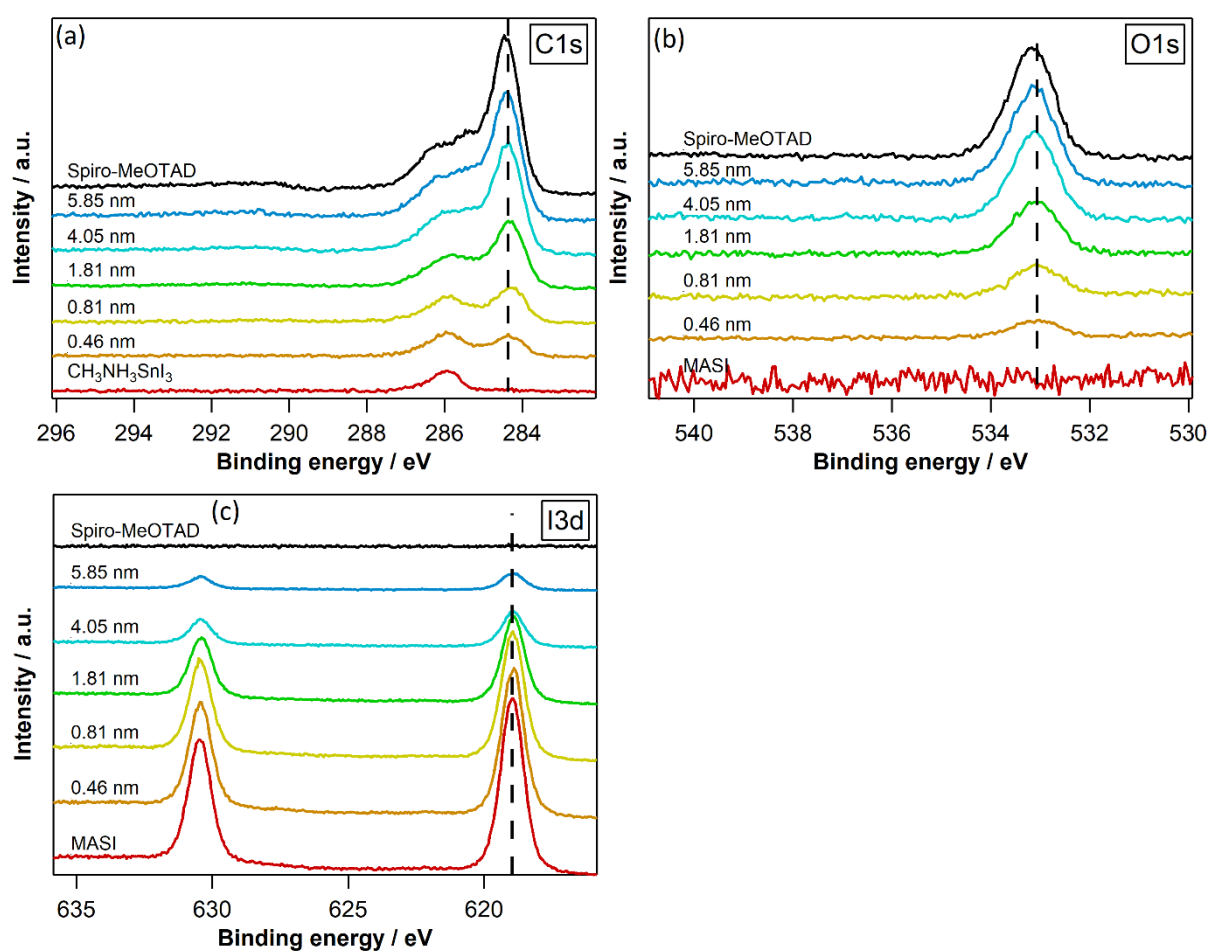


Figure S2. Detailed spectra of the MASI / Spiro-MeOTAD interface with (a) C1s, (b) O1s and (c) I3d.

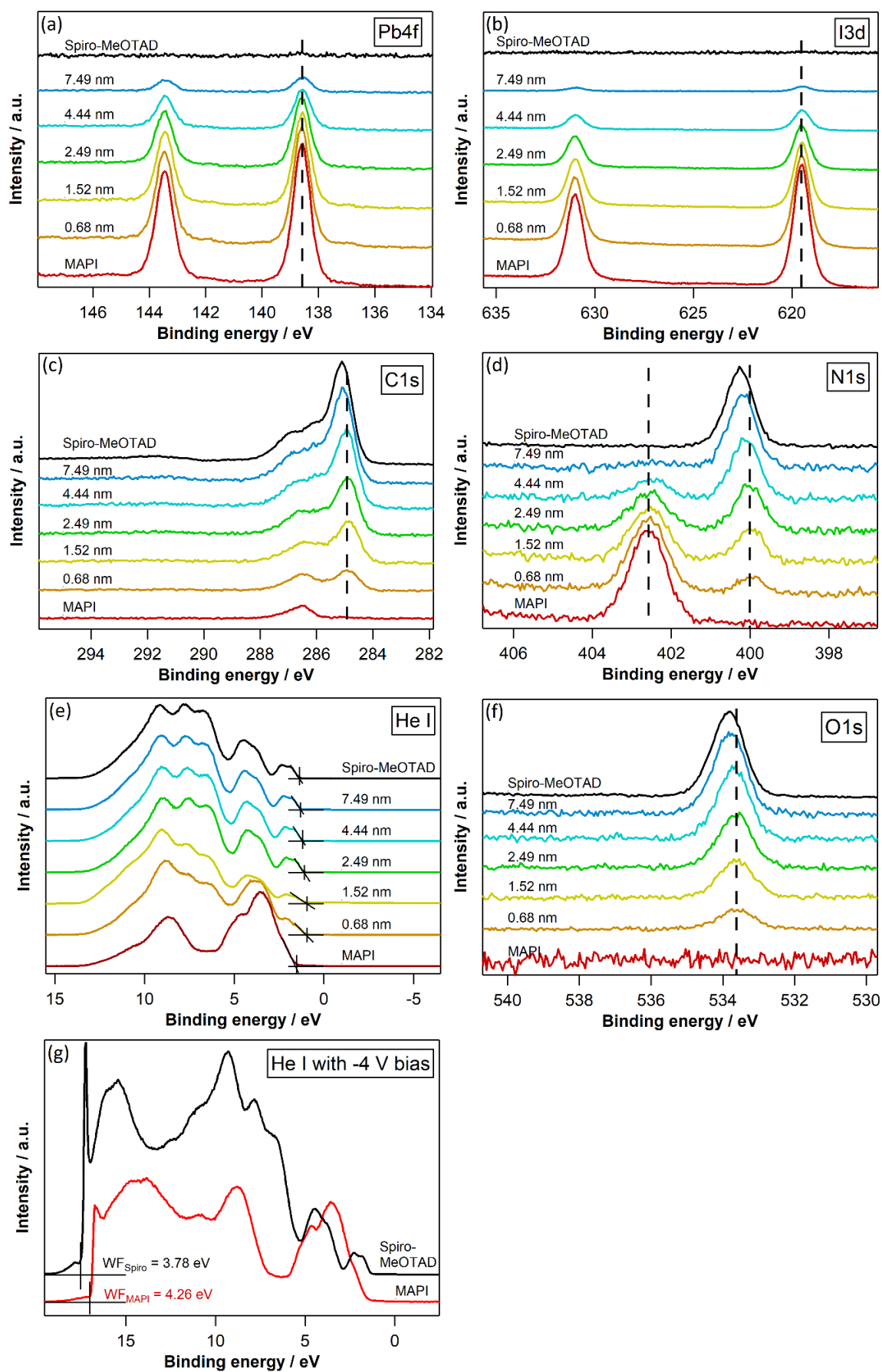


Figure S3. Detailed spectra of the MAPI / Spiro-MeOTAD interface with (a) Pb4f, (b) I3d, (c) C1s, (d) N1s, (e) He I, (f), O1s and (g) He I with an applied bias of -4V .

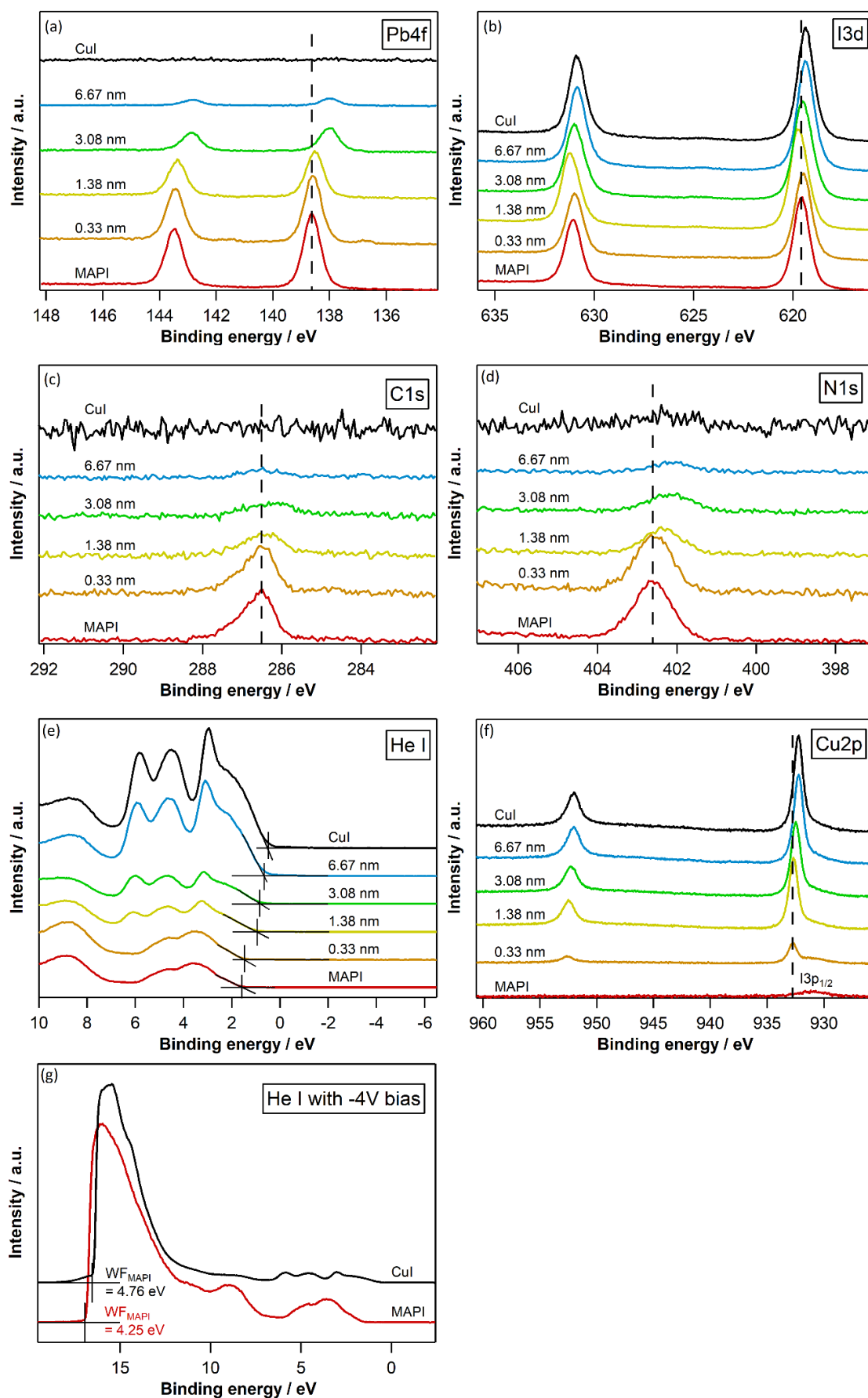


Figure S4. Detailed spectra of the MAPI / CuI interface with (a) Pb4f, (b) I3d, (c) C1s, (d) N1s, (e) He I, (f) Cu2p and (g) He I with an applied bias of -4V .

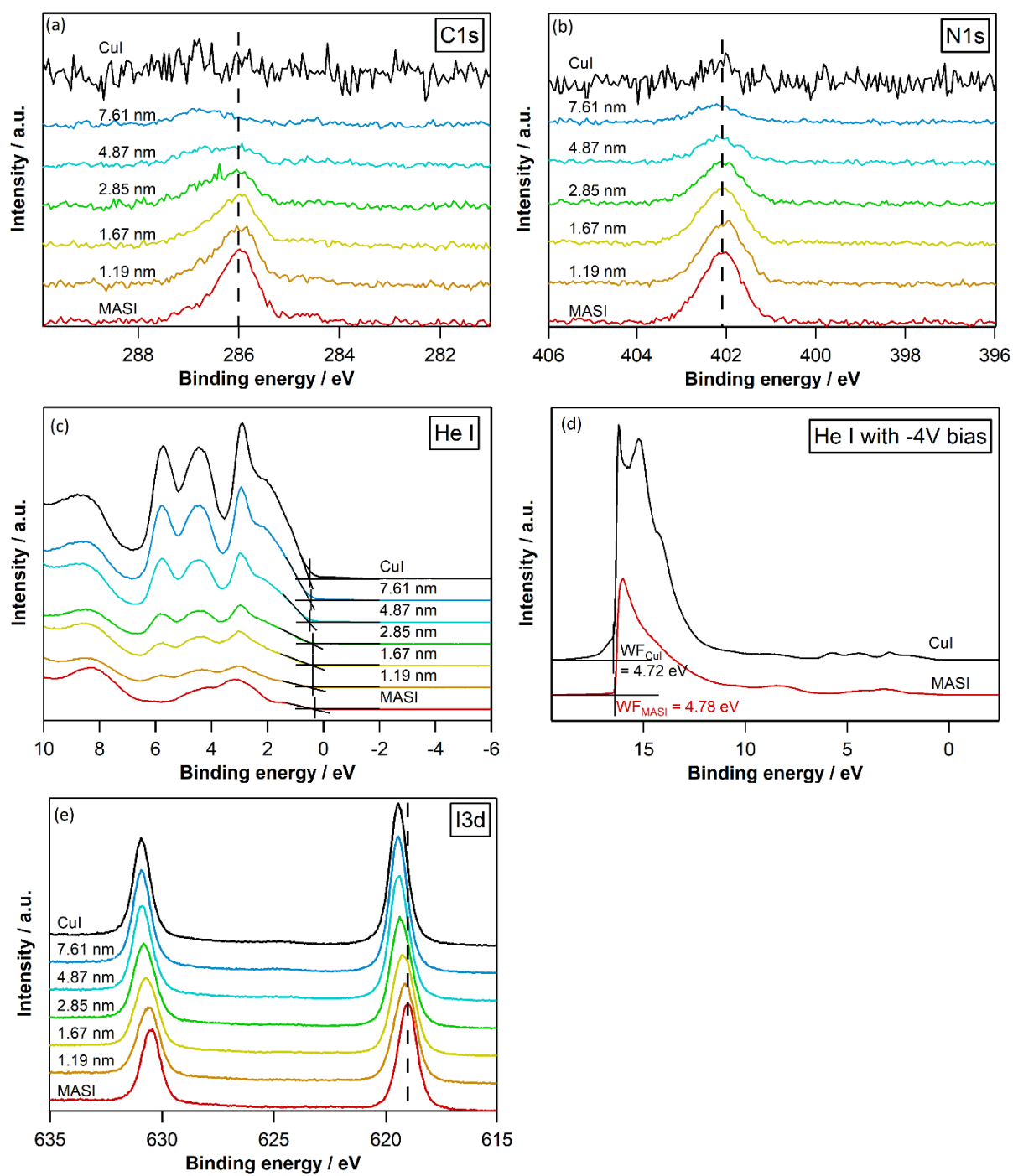


Figure S5. Detailed spectra of the MASI / CuI interface with (a) C1s, (b) N1s, (c) He I, (d) He I with an applied bias of -4 V and (e) I3d.

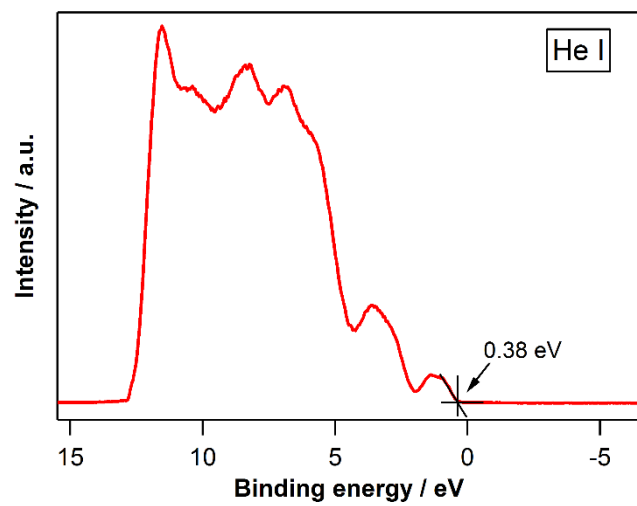


Figure S6. He I measurement of a doped spin-coated Spiro-MeOTAD film.