Field Effect Transistors Using Atomically Thin Layers of Copper Indium Selenide (CuInSe)\textsuperscript{1} PRASANNA PATIL, SUJOY GHOSH, MILINDA WASALA, Southern Illinois University Carbondale, SIDONG LEI, ROBERT VAJTAI, PULICKEL AJAYAN, Rice University, SAIKAT TALAPATRA, Southern Illinois University Carbondale — We will report fabrication of field-effect transistors (FETs) using few-layers of Copper Indium Selenide (CuInSe) flakes exfoliated from crystals grown using chemical vapor transport technique. Our transport measurements indicate n-type FET with electron mobility $\approx 3 \text{ cm}^2 \text{ V}^{-1} \text{ s}^{-1}$ at room temperature when Silicon dioxide ($\text{SiO}_2$) is used as a back gate. Mobility can be further increased significantly when ionic liquid 1-Butyl-3-methylimidazolium hexafluorophosphate (BMIM-PF$_6$) is used as top gate. Similarly subthreshold swing can be further improved from 103 V/dec to 0.55 V/dec by using ionic liquid as a top gate. We also found ON/OFF ratio of $\approx 10^2$ for both top and back gate. Comparison between ionic liquid top gate and $\text{SiO}_2$ back gate will be presented and discussed.

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