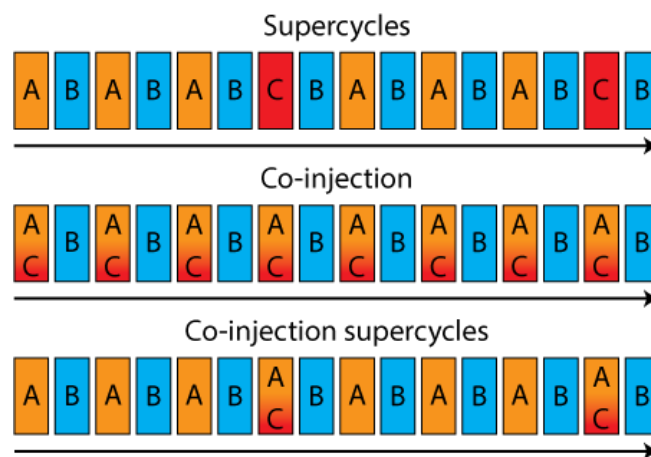
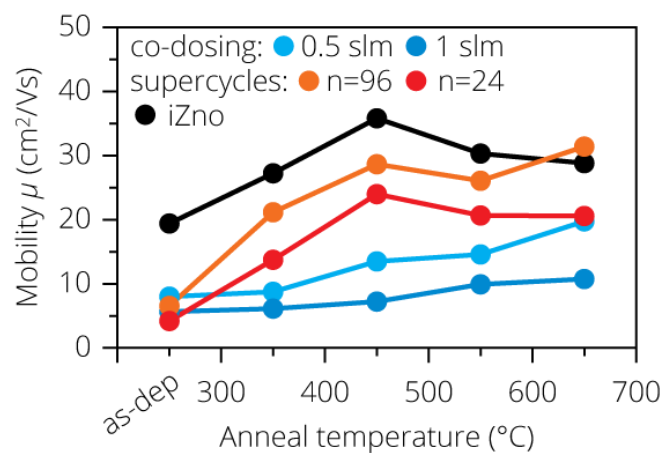


**Figure 1:** Deposition head of atmospheric pressure spatial ALD tool used in this work. Precursor gas is separated from H<sub>2</sub>O co-reactant by N<sub>2</sub> gas. All excess gas is exhausted through additional slits. The substrate table moves back and forth under the head, each pass resulting in one ALD cycle.



**Figure 2:** Scheme of the supercycles, co-injection and co-injection supercycles approach with cycles of precursors A and/or C, and co-reactant B. Purge steps after each cycle are omitted from the scheme for comprehensibility.



**Figure 3:** Charge carrier Hall mobility of spatial ALD co-dosing and supercycles ZnO:Al films, and an intrinsic ZnO film. Films were annealed in forming gas post-deposition.