Title: Ni thin film deposition using hot wire ALD and non-halogen precursor

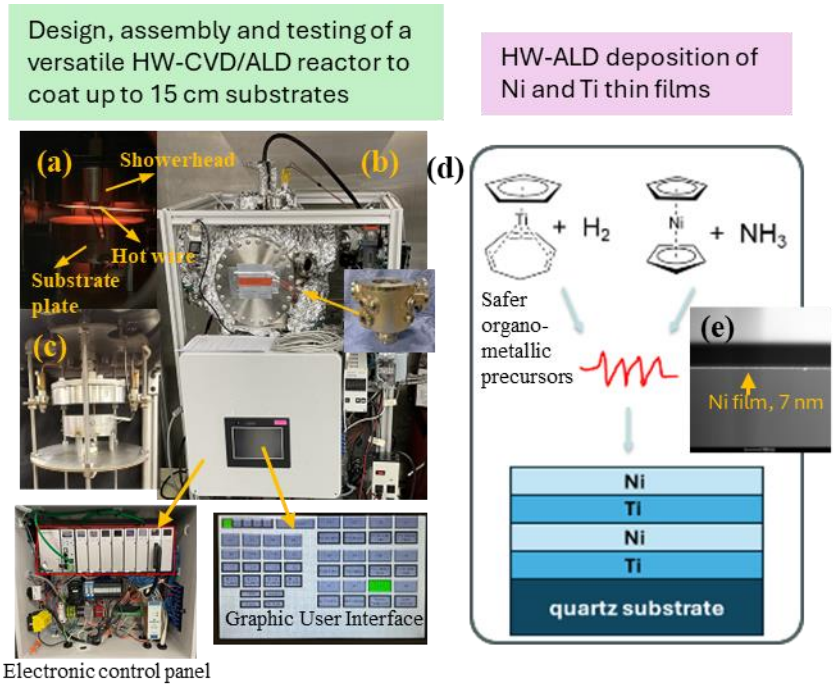

Fig. 1: (a-c) Pictures of the versatile Hot Wire (HW) CVD/ALD reactor assembled at ACT. (b) shows the *reactor overall assembly*. The showerhead-substrate-single hot wire assembly is shown in (a; ON) and (c; OFF). The red-yellow hot glowing single hot wire over a substrate holder alumina ceramic can be seen in (a). Hot Wire is placed between the precursor showerhead and the substrate holder plate. (d) shows a schematic of the multilayer Ni-Ti over quartz substrate under study at ACT, using safer metal-organic precursors; (e) Sample TEM image showing the 7 nm Ni thin film deposited by HW-ALD.

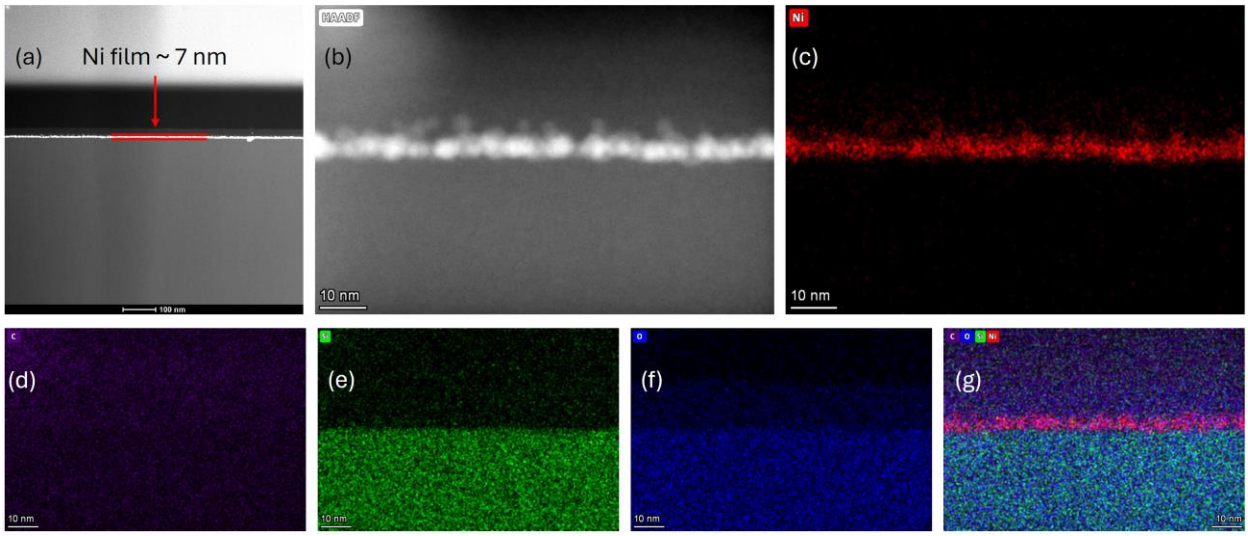

Fig. 2: Cross-sectional (Transmission Electron Microscopy) TEM and Scanning-TEM/ High-Angle Annular Dark-Field (HAADF) micrographs to show Ni deposition via HW-ALD process: (a) Ni film with thickness 7 nm after 100 HW-ALD cycles showing precise deposition on quartz substrate; (b)-(g) show STEM/HAADF micrographs showing the Ni film, and individual elemental distribution on quartz substrate with pure Ni without Ni oxide (g) on the top.