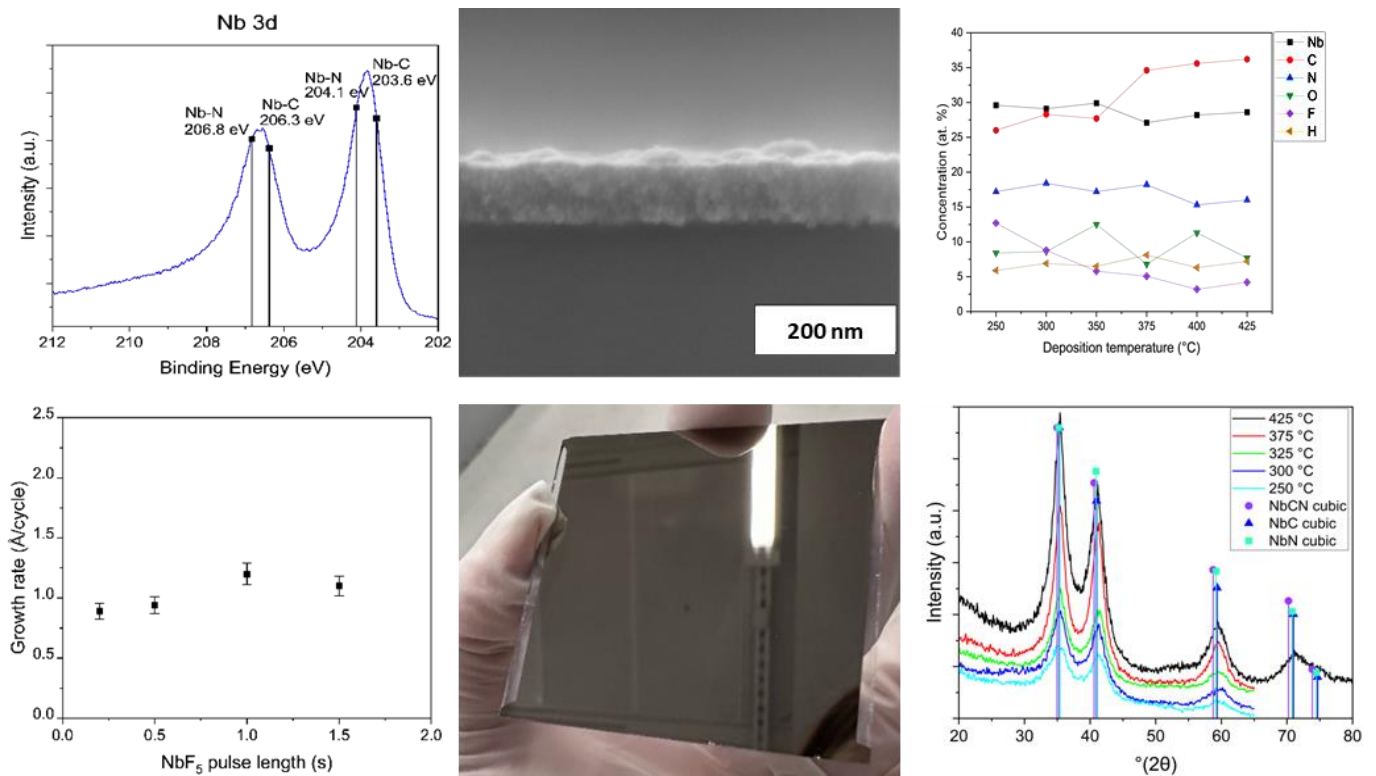


## Appendix



**Figure 1.** Top left: Nb 3d XPS spectrum of  $\text{NbC}_x\text{N}_y$  film deposited at 425 °C. Top middle: Cross-section SEM image of a 51 nm  $\text{NbC}_x\text{N}_y$  film on a Si substrate. Top right: ToF-ERDA of  $\text{NbC}_x\text{N}_y$  films deposited at various temperatures. Bottom left:  $\text{NbC}_x\text{N}_y$  film growth rate as a function of  $\text{NbF}_5$  pulse lengths at a deposition temperature of 425 °C. Bottom middle: Photograph of a  $\text{NbC}_x\text{N}_y$  film on soda lime glass. Bottom right: XRD diffractograms of  $\text{NbC}_x\text{N}_y$  films deposited at various temperatures.