

# Formation of 3D Cr<sub>2</sub>C through solid state reaction-mediated Al extraction within Cr<sub>2</sub>AlC/Cu thin films

Clio Azina<sup>1\*</sup>, Justinas Palisaitis<sup>2</sup>, Dimitri Bogdanovski<sup>1</sup>, Tim Bartsch<sup>1</sup>, Rajib Sahu<sup>1,3</sup>, Christina Scheu<sup>3</sup>, Per O. Å. Persson<sup>2</sup>, Per Eklund<sup>2,4</sup>, Jochen M. Schneider<sup>1</sup>

<sup>1</sup>Materials Chemistry, RWTH Aachen University, Kopernikusstr. 10, 52074 Aachen, Germany

<sup>2</sup>Thin Film Physics Division, Department of Physics, Chemistry and Biology (IFM), Linköping University, SE-581 83 Linköping, Sweden

<sup>3</sup>Max-Planck-Institute for Sustainable Materials, Max-Planck-Str. 1, 40237 Düsseldorf, Germany

<sup>4</sup>Inorganic Chemistry, Department of Chemistry - Ångström Laboratory, Uppsala University, Box 538, SE-751 21 Uppsala, Sweden

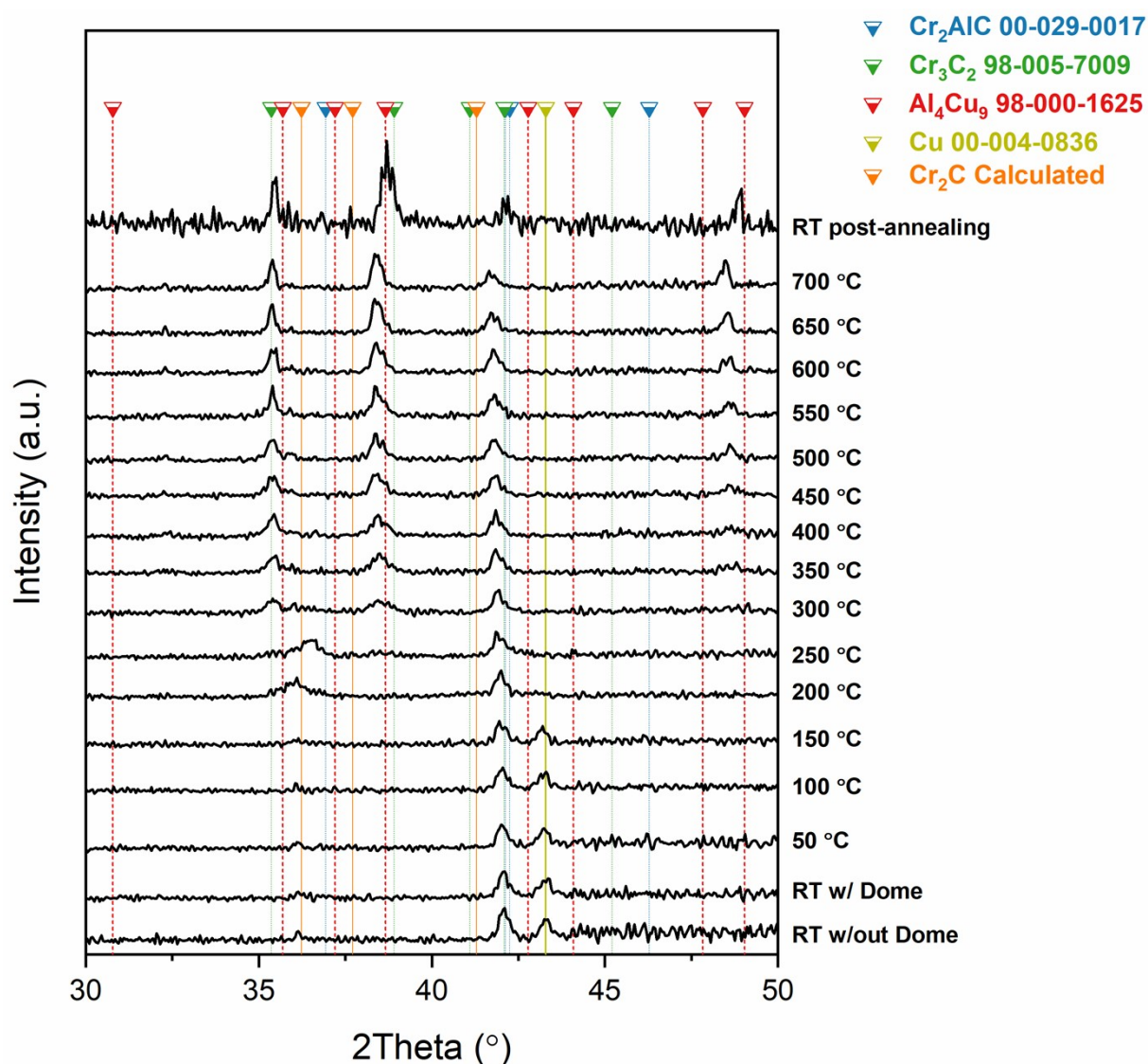


Figure S1: XRD patterns obtained before, during, and after in situ heating of as deposited  $\text{Cr}_2\text{AlC}/\text{Cu}$  assemblies, up to 700 °C with 50 °C steps.

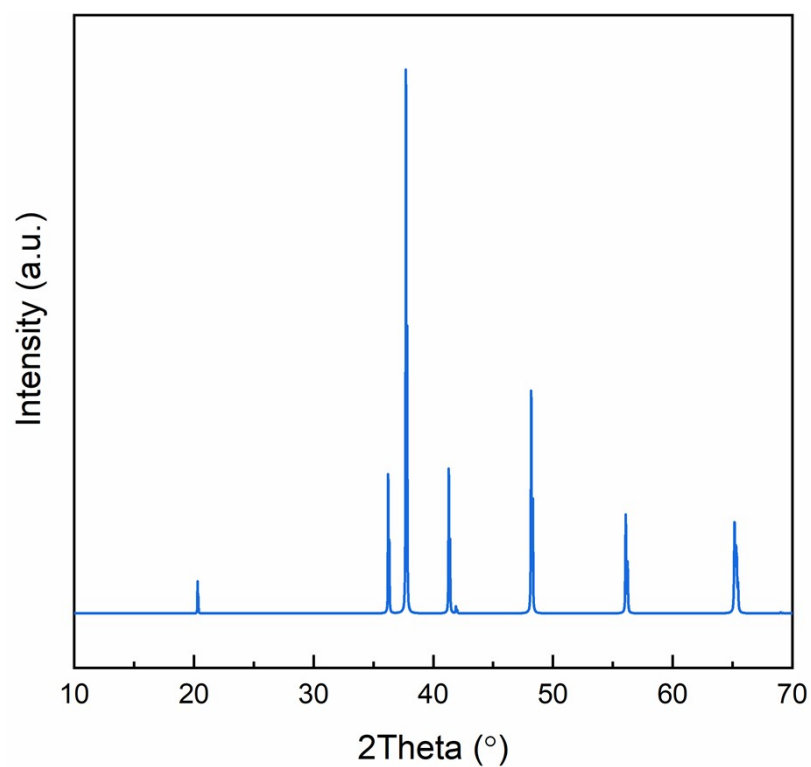
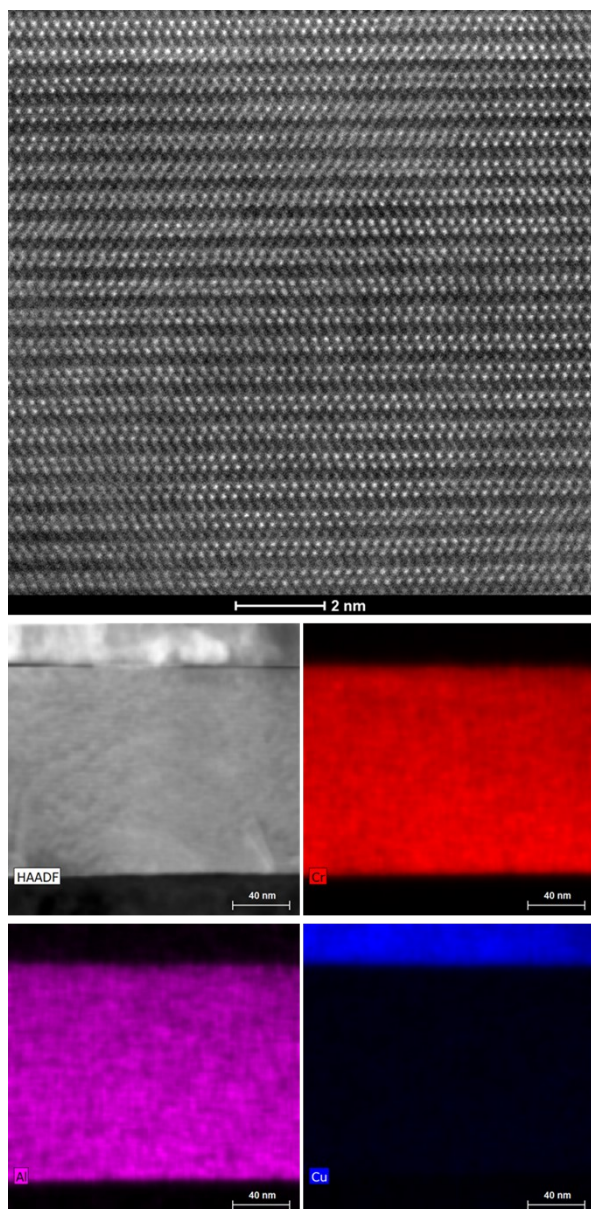


Figure S2: XRD pattern of the simulated  $\text{Cr}_2\text{C}$  structure



*Figure S3: STEM image of  $\text{Cr}_2\text{AlC}$  film, and EDX maps of an as-deposited  $\text{Cr}_2\text{AlC}/\text{Cu}$  assembly*

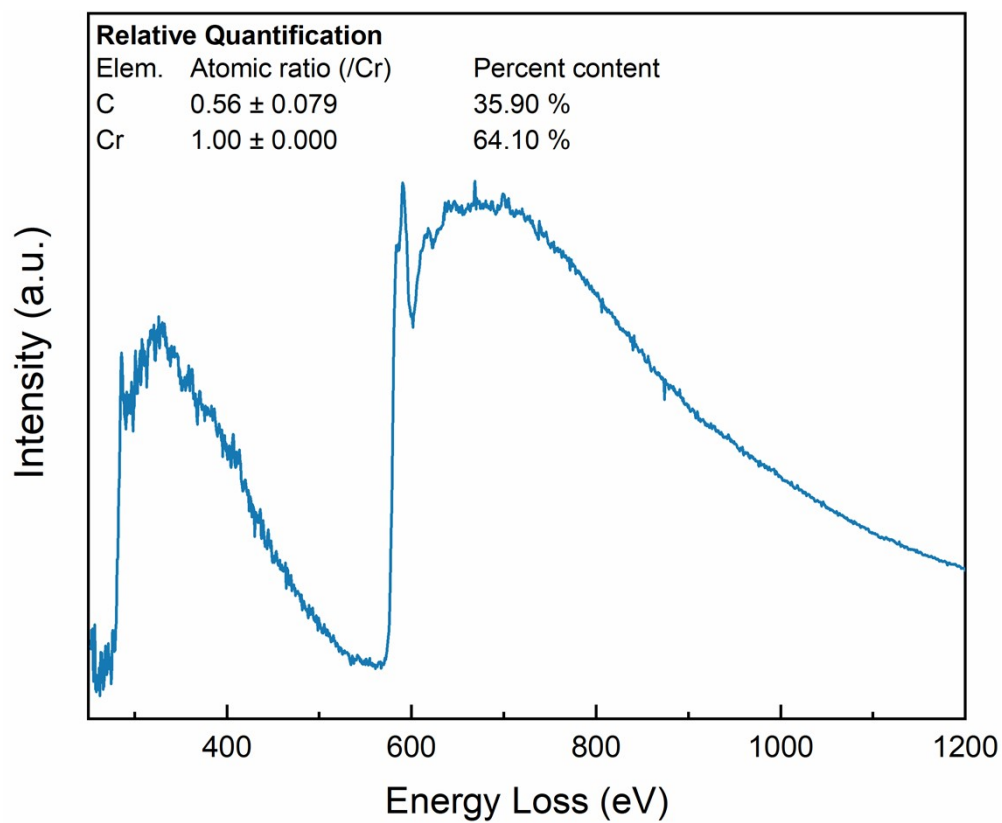


Figure S4: EELS spectrum of Cr-rich grain

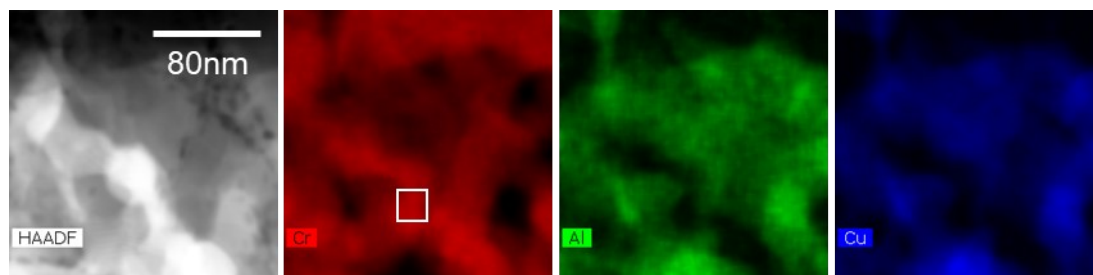


Figure S5: STEM image and EDX maps of the annealed  $\text{Cr}_2\text{AlC}/\text{Cu}$  assembly. The white box indicates which grains/zones correspond to the STEM images shown in Figure 4.