

Supplementary materials for the article „Nanoporous copper films - how to grow porous films by magnetron sputter deposition” by Michał A. Borysiewicz, Patrycja Barańczyk, Jakub Zawadzki, Marek Wzorek, Rafał Zybala, Beata Synkiewicz-Musialska, and Paweł Krzyściak

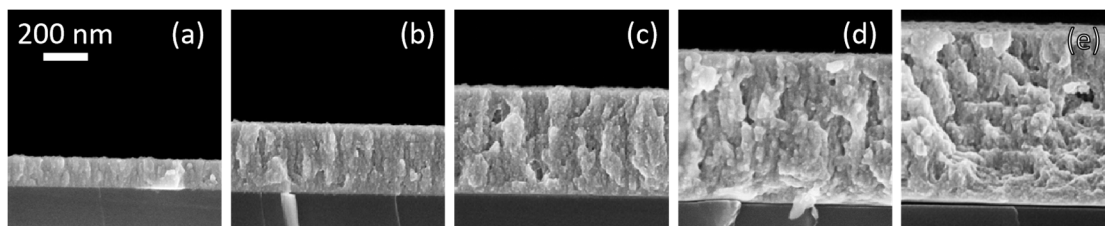


Figure S1. SEM cross-section images of Cu films deposited at 18 sccm Ar, 0.9 sccm O₂, 0.4 Pa, RT and varied DC power of 40 W (a) ,80 W (b) ,120 W (c) ,160 W (d) and 200 W (e).

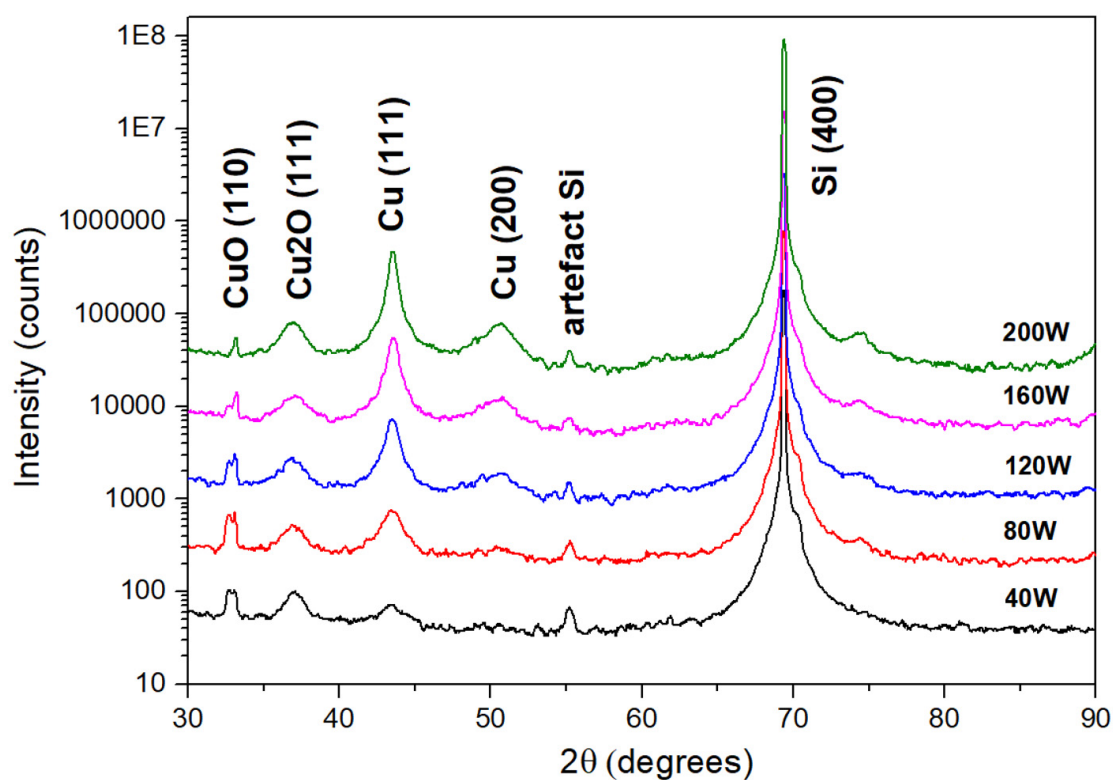


Figure S2. XRD patterns of the Cu flms deposited with varied power.

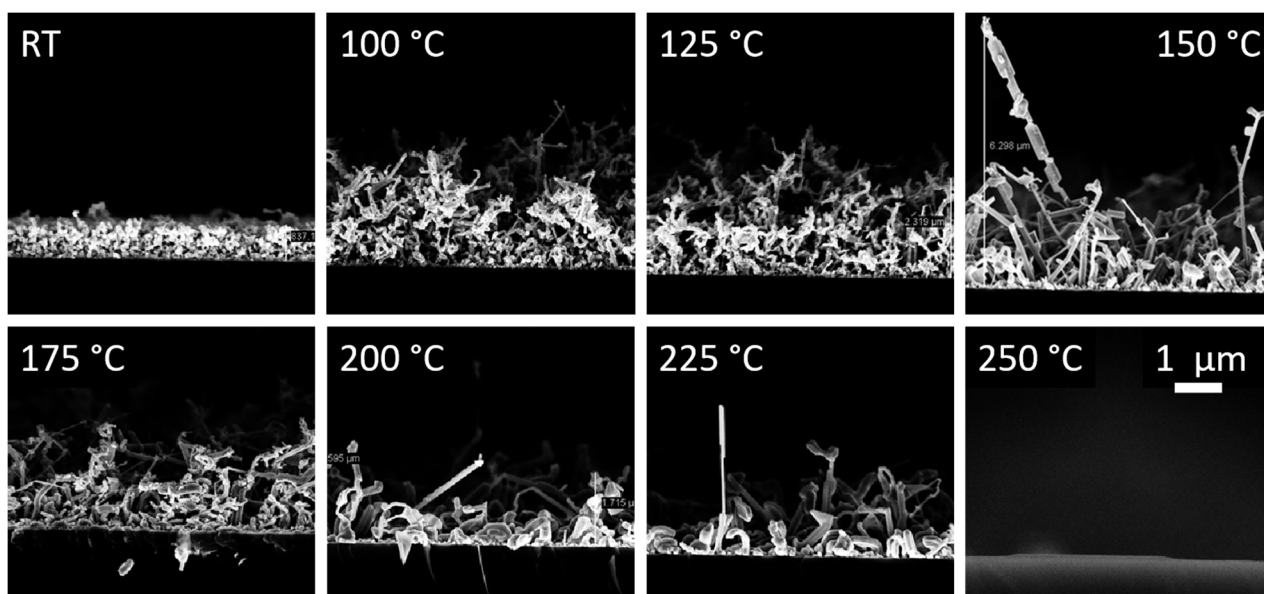


Figure S3. SEM cross-section morphologies of porous films deposited at different temperatures under 80W DC power, 3 sccm Ar, 0.6 sccm O₂ and 0.4 Pa total pressure.

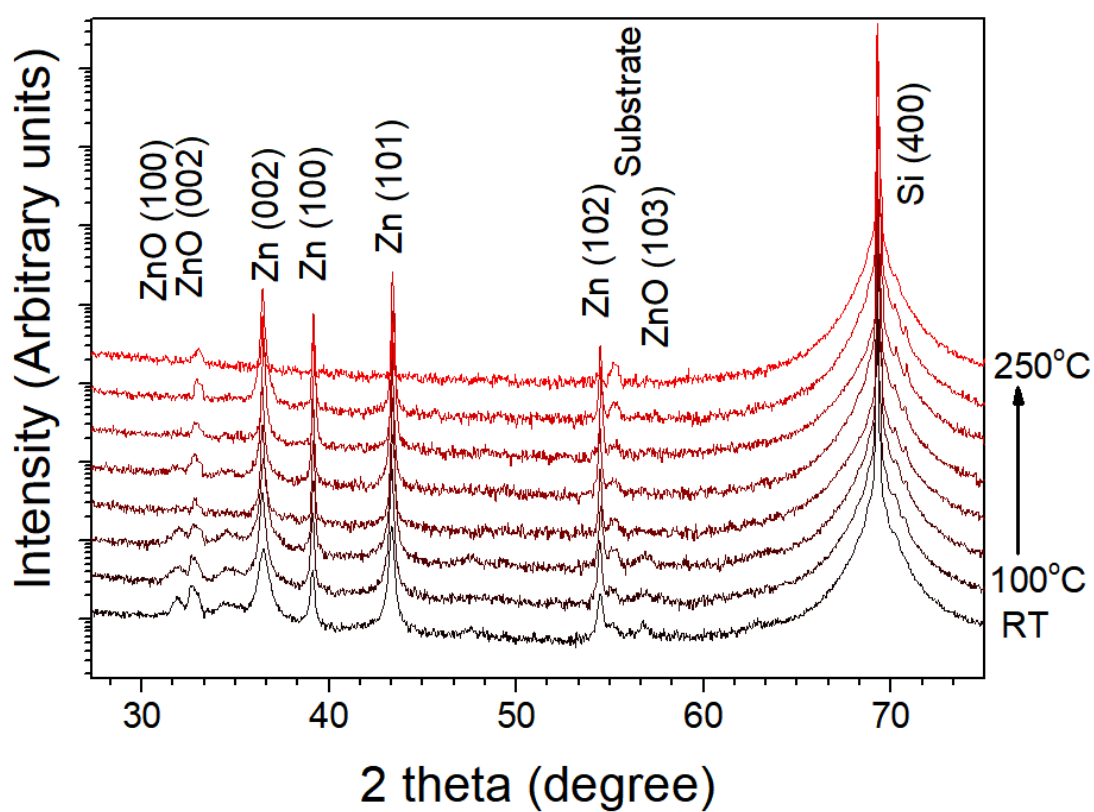


Figure S4. XRD patterns of porous Zn films deposited at elevated temperatures.

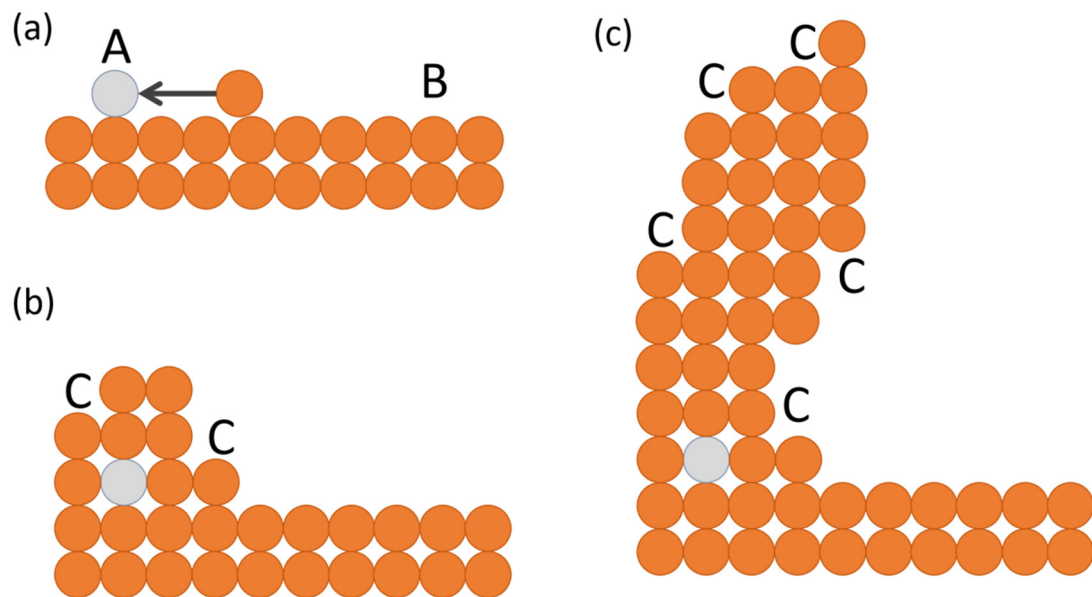


Figure S5. Schematic growth modes for porous metals (dark circles represent metal atoms, light circles represent oxygen atoms). (a) In a low-mobility scenario, the metallic adatom is free to move along the growth front, i.e. surface of the metal which was already deposited, it will more probably attach to an already bonded oxygen atom (site A), than to an oxygen-free surface (site B). (b) The oxygen site serves as a nucleation site, since the new incoming metal atoms will diffuse to it, bond to it and then form kinks - low energy sites which are favorable for new atoms to bond with (sites C). (c) In a high temperature scenario, the diffusion along the growing crystals is favorable due to increased mobility. The creation of additional kink-like sites (sites C) will take place, however the crystallite will mostly grow away from the substrate, not along it.

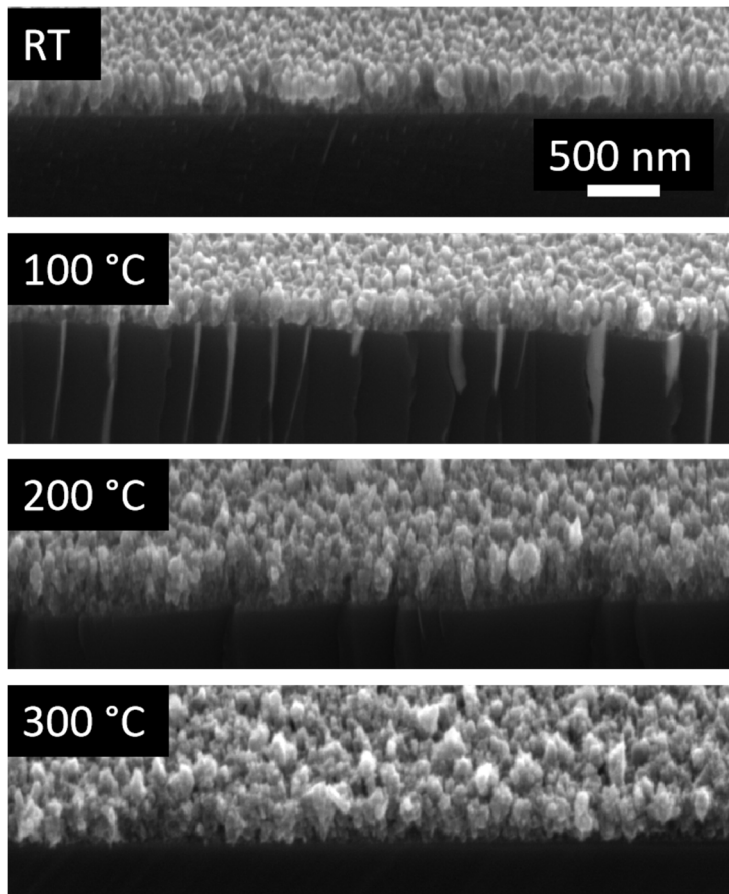


Figure S6. SEM cross-section morphologies of aluminium films deposited at different temperatures under 80W DC power, 6 sccm Ar, 0.3 sccm O₂ and 0.4 Pa total pressure.