

Press release

Defence on 04 December 2020

Textiles converting body heat to electricity and 3D printed tools usable even in vacuum

Title of the doctoral thesis	Atomic layer deposition towards novel device applications
Content of the doctoral thesis	Thermoelectrics are materials that can convert different waste heat flows directly into electricity. In this dissertation thin-film thermoelectric devices were fabricated on various flexible substrates, including textiles. The textile-based thermoelectric devices are of high demand for the next-generation integrated electronics where the body heat could be converted into electricity by devices embedded in the clothes to power sensors and other low-power devices. Here the atomic layer deposition (ALD) is the key fabrication technology as it is capable of producing high-quality coatings with atomic-level precision onto different surfaces of any shape. This fine control is the basis of modern electronics and the enabler of novel material combinations such as the inorganic-organic hybrids challenged in this thesis work. As another demonstration of the unique benefits of ALD, it was employed in this work to deposit efficient barrier layers for 3D printed tools to sustain in vacuum environment. The ALD fabricated barrier layers performed better than commercial sealants opening the way for cheap, open source 3D printed laboratory equipment.
Field of the doctoral thesis	Inorganic chemistry
Doctoral candidate and contact information	M.Sc. (Tech.) Giovanni Marin Giovanni.marin@aalto.fi
Defence date and time	4 December 2020 at 12 o'clock
Remote defence	https://aalto.zoom.us/j/65635467304
Place of defence	Aalto University School of Chemical Engineering, Lecture hall Ke1, Kemistintie 1, (main door at Biologinkuja) Espoo
Opponent(s)	Professor David Munos-Rojas, Institute of Physics (INP), CNRS, Grenoble, France
Custos	Professor Maarit Karppinen, Aalto University School of Chemical Engineering
Link to electronic thesis	https://aaltodoc.aalto.fi/handle/123456789/47414
Keywords	ALD, MLD, thermoelectricity, 3D printing, hybrid materials, textile devices