



Minute-Made Bi_2Te_3 Films Via Electrophoretic Deposition

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Content



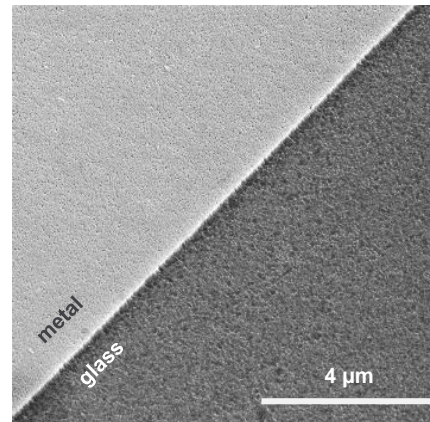
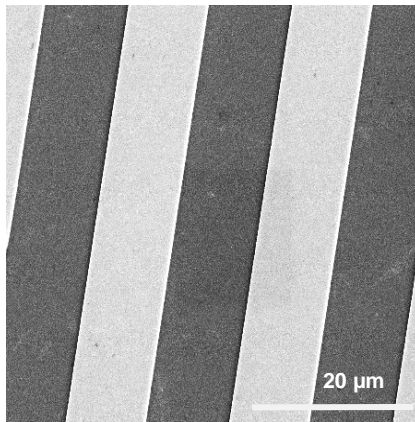
- Electrophoretic deposition (EPD) of nanoparticles
- Substrate design and fabrication via photolithography
- Electrophoretic deposition (EPD) of Bi_2Te_3 NPs
- Transport property measurements

Introduction - EPD

- EPD process: migration of charged particles under electric field
- Kinetics of EPD process and quality of the deposited film depends on many parameters
- Assembly of TE nanostructures with pre-defined morphology and surface chemistry

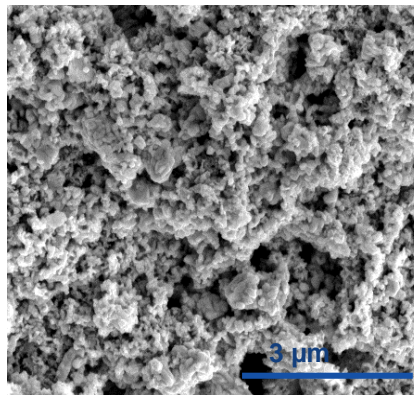
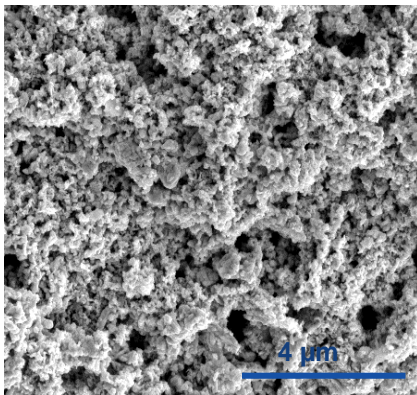
Experimental procedure

- Substrate design and fabrication via photolithography
 - ✓ Designing the pattern in KLayout software
 - ✓ Transferring the pattern on glass



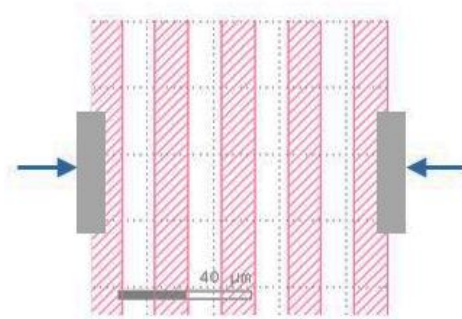
Experimental procedure

- Electrophoretic deposition (EPD) of Bi_2Te_3 NPs
- ✓ Microwave assisted hydrothermal synthesis
- ✓ Dispersion of Bi_2Te_3 NPs in organic mixture

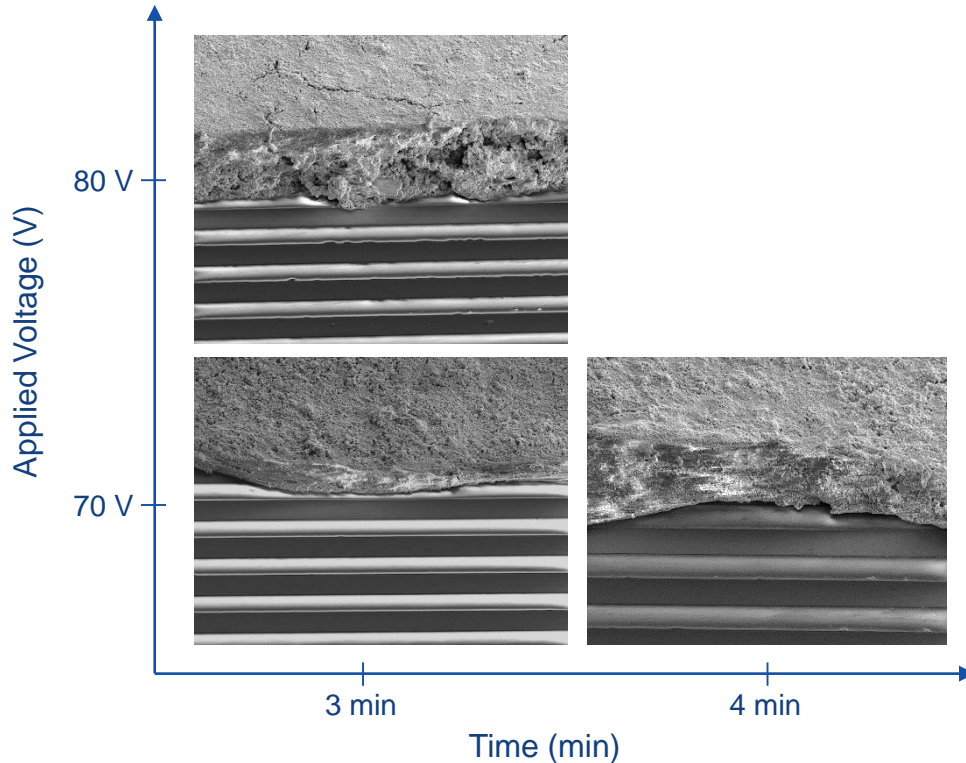


Experimental procedure

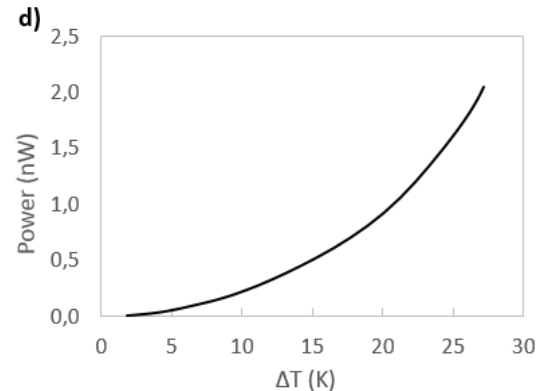
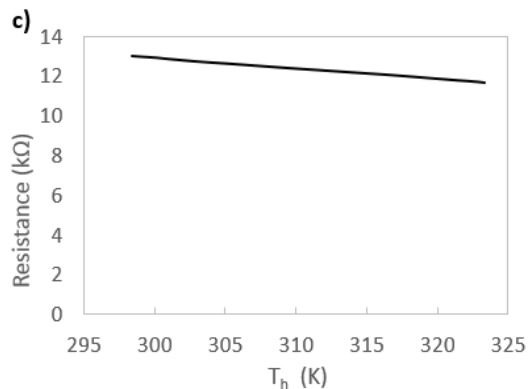
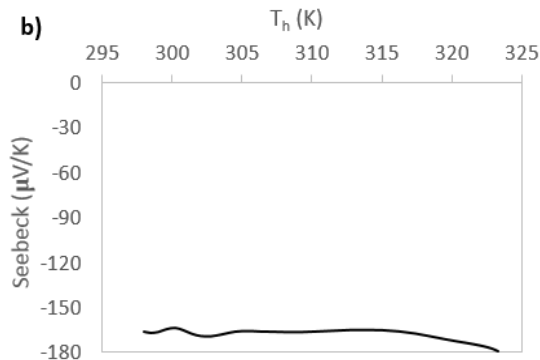
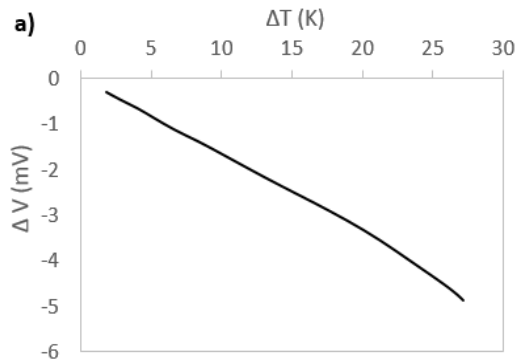
- Transport property measurements
- ✓ Putting silver contacts
- ✓ Measurements via 2-probe technique



EPD of Bi_2Te_3 Nanoparticles



Transport measurements





Conclusion

- EPD media formulation allowed the fabrication of crack free films
- Special substrate design and fabrication enabled evaluation of transport properties
- Resistance is highly reduced by addition of dithiol molecules
- Study the effect of different molecular linkers with various size and morphology

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On the electrophoretic deposition of Bi_2Te_3 nanoparticles through electrolyte optimization and substrate design

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