Electrode and Electrolyte Materials for Thin Film Microbatteries

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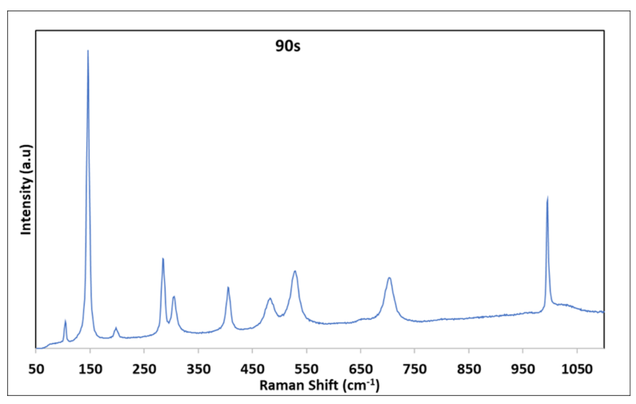
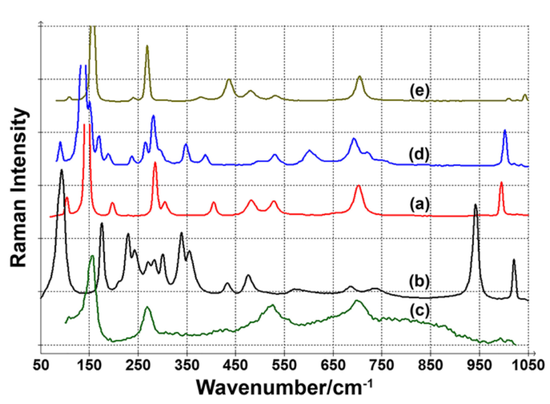
Challenges facing IoT wireless sensors

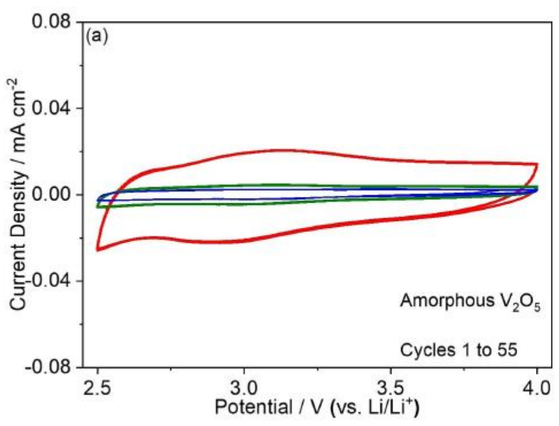
To enable **long-life Internet of Things (IoT) sensors need to integrate energy storage solutions** with energy harvesters and appropriate power management systems.

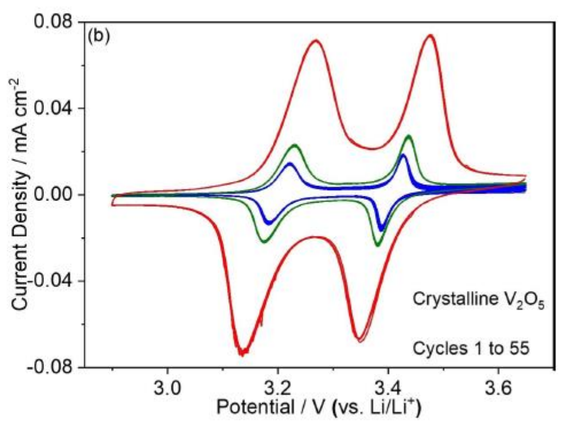
Electrodes for lithium microbatteries

High energy density required for thin film microbatteries. Investigated Li metal anode and V_2O_5 cathodes









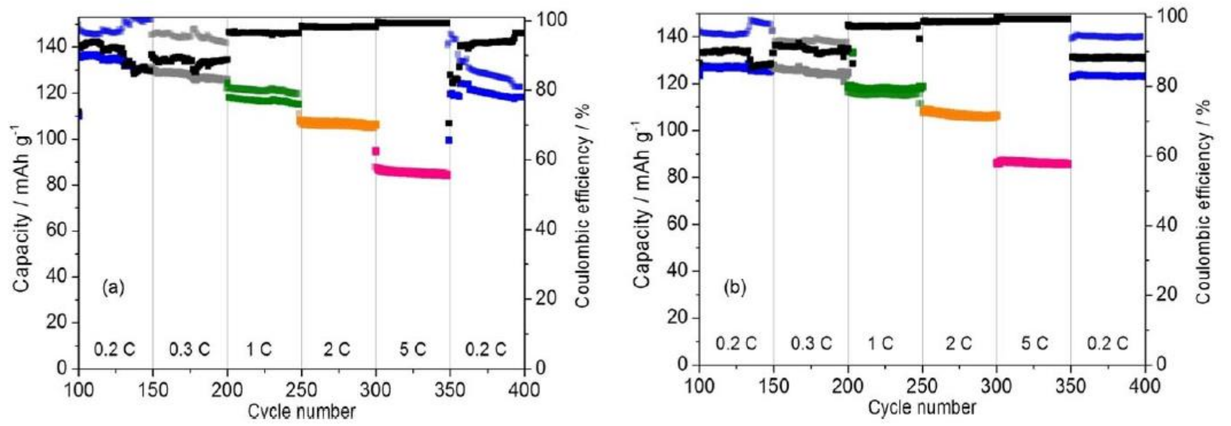
Amorphous and crystalline plated V_2O_5 cathodes

Electrolytes for lithium metal microbatteries

Ionic liquid electrolytes and polymer gel versions can be utilized with lithium metal anodes and V_2O_5 cathodes

Full cell rate capability

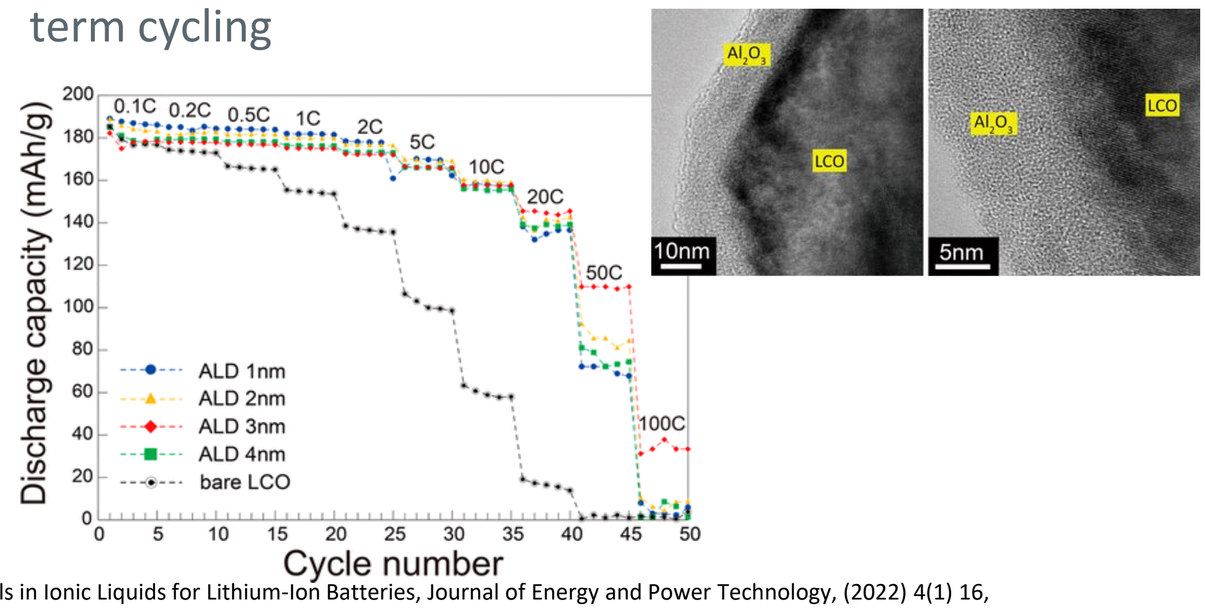
Cells with ionic liquid or polymer gel electrolyte retain high coulombic efficiency during high rate charge and discharge



Ionic liquid based 0.5 M LiTFSI in C_4mpyrTFSI and polymer gel with lithium metal anode and crystalline V_2O_5 cathode

Next steps

Interface engineering using atomic layer deposition to enhance rate capability and enhance stability for long term cycling



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Acknowledgments

- Enables-project.eu funding from the European Union's Horizon 2020 research and innovation program, Grant Agreement no. 730957
- SFI Connect Centre supported in part by a research grant from SFI co-funded by the European Regional Development Fund under Grant Number 13/RC/2077.

Ireland's European Structural and Investment Funds Programmes 2014-2020 — Co-funded by the Irish Government and the European Union
European Union — European Regional Development Fund
University College Cork, Ireland — Coláiste na hOllscoile Corcaigh
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