

Istanbul Medeniyet University

Assoc. Prof. Sevda Avcı

Infrastructure at BİLTAM

BİLTAM – Scientific and Technological Research and Application Center
Istanbul Medeniyet University

Active Material Synthesis:

- Solid state synthesis (bulk materials): High temperature box and tube furnaces
- 1D nanofibers: Electro spin systems

Battery Construction equipment:

- Hydraulic Crimper for coin cells
- Compact Precision Disc Cutter
- Micrometer adjustable film applicator
- Modular Glove box – Mbraun MB200B
- Vacuum ovens

Infrastructure at BILTAM

Characterization:

- X-ray Diffraction (XRD) - Bruker D8 Discovery
- Atomic Force Microscope (AFM)- PARK SYSTEMS – XE100E
- Scanning Electron Microscope (SEM)
- Cyclic voltametry
- 8 channel battery analyzer

Capabilities

- Active material synthesis in bulk and nano scales
- Coin cell construction
- Electrochemical characterization
- Synchrotron characterization techniques: X-ray absorption spectroscopy and x-ray diffraction
- Magnetic and electrical transport properties

Key People:



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Istanbul Medeniyet University
Dept. Engineering Physics



Prof. Serdar Altın
Inonu University
Dept. Physics

Graduate Students:

Erdoğan Öz

Gökhan Ekinci

Selma Ecer

Ahmet Yasin Yılmaz

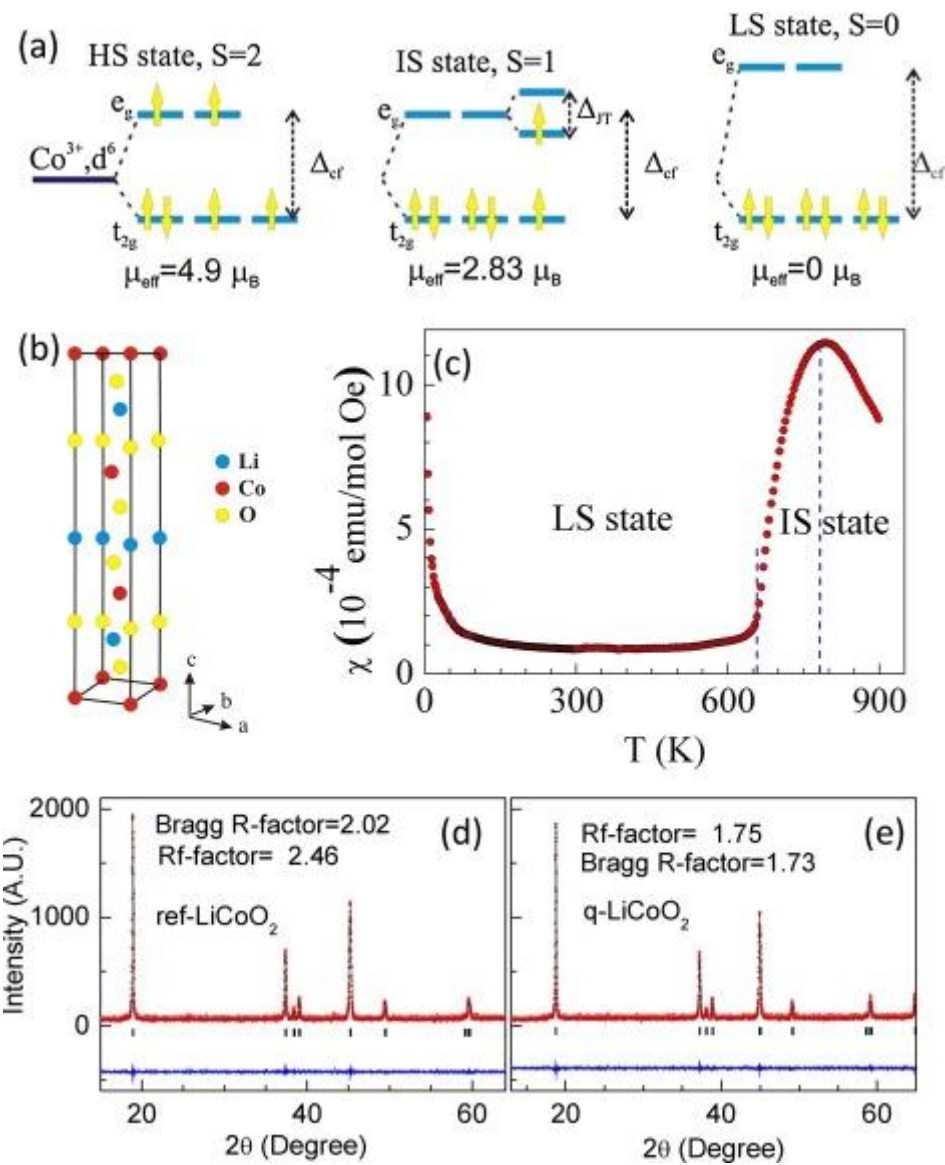
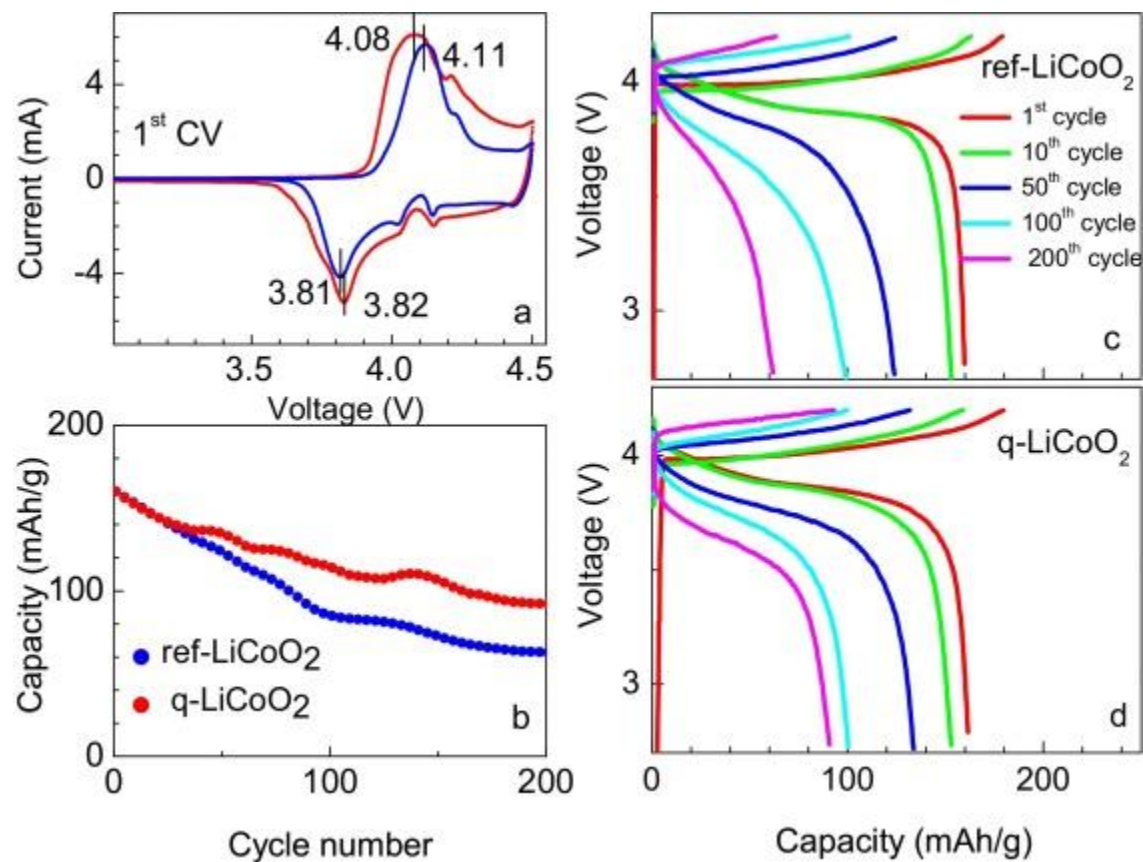
Past Research

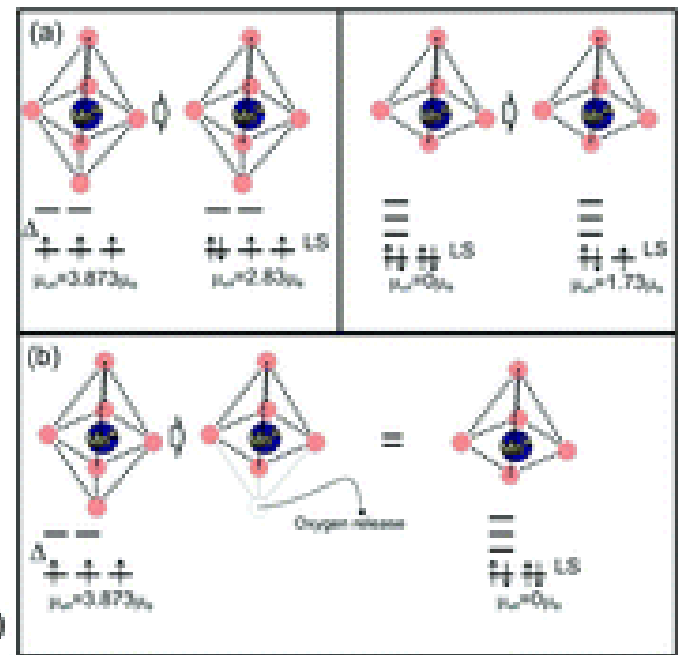
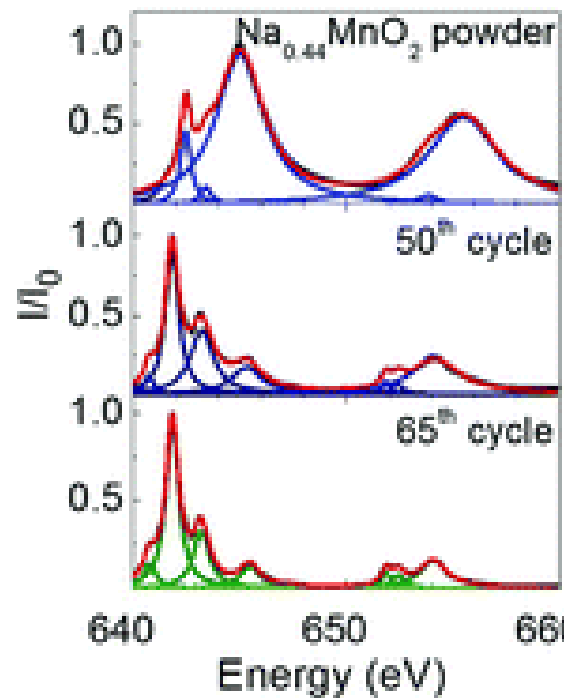
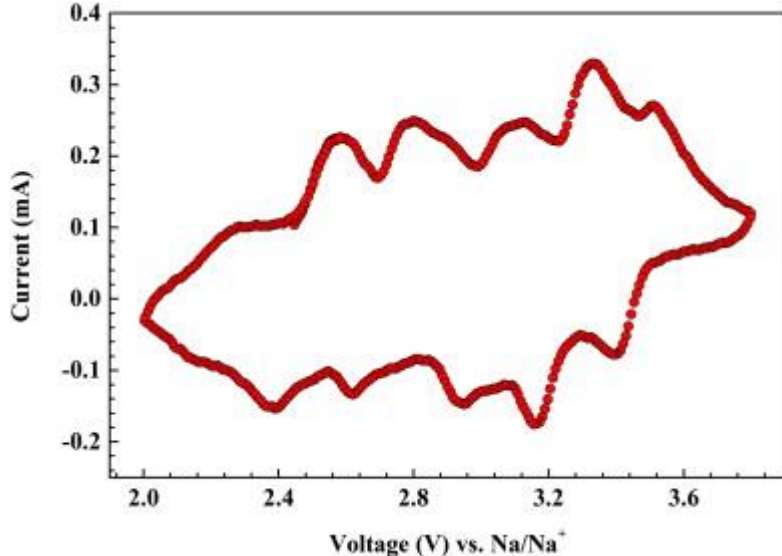
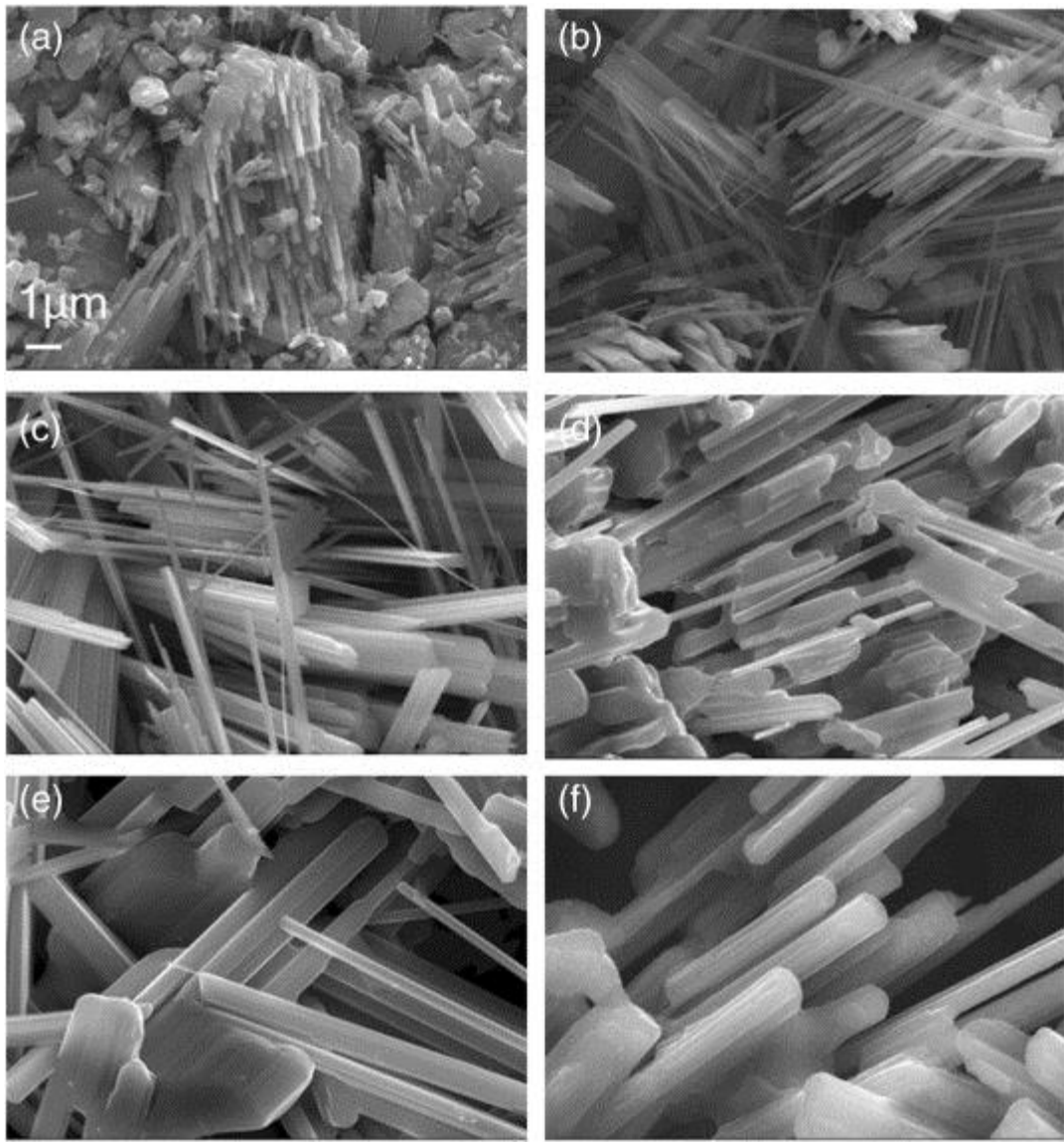
Cathode materials for Li and Na-ion batteries:

- $\text{Na}_{0.44}\text{MnO}_2$
- $\text{LiCo}_{1-x}\text{B}_x\text{O}_2$
- $\text{LiMn}_{2-x}\text{B}_x\text{O}_2$

1. 'Investigations of the capacity fading mechanism of Na 0.44 MnO 2 via ex situ XAS and magnetization measurements' S Altin, E Oz, E Altin, S Demirel, A Bayri, S Avci, ***Dalton Transactions* 47, 17102-17108 (2018)**.
2. 'Thermally induced spin state transition in LiCoO2 and its effects on battery performance' E. Oz, S. Demirel, S. Altin, E. Altin, A. Bayri and S. Avci, ***Electrochimica Acta* 248, 449 (2017)**.
3. 'Enhancement of battery performance of LiMn_2O_4 : correlations between electrochemical and magnetic properties' S. Demirel, E. Oz, S. Altin, A. Bayri, E. Altin and S. Avci, ***RSC Adv.* 6, 43823 (2016)**.
4. 'Electrochemical effects and magnetic properties of B substituted LiCoO_2 : Improving Li-battery performance' E. Oz, S. Altin, S. Demirel, A. Bayri, E. Altin, O. Baglayan, S. Avci, ***Journal of Alloys and Compounds*, 657, 835 (2016)**.
5. 'Growth mechanism and magnetic and electrochemical properties of $\text{Na}_{0.44}\text{MnO}_2$ nanorods as cathode material for Na-ion batteries' S. Demirel, E. Oz, E. Altin, S. Altin, A. Bayri, P. Kaya, S. Turan, S. Avci, ***Materials Characterization*, 105, 104 (2015)**.

LiCoO₂





XAS at SOLEIL in France

Ongoing research

- 1D electrospun nanofiber active materials for Na-ion battery cathodes.
- Determine the charge/discharge mechanism in the atomic scale
- In-situ and ex-situ synchrotron techniques (XAS and XRD) Sesame and DESY
- Ex-situ magnetization, SEM, TEM and XRD

Contacts

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