Skysong Innovations
Advancing the Arizona State University Knowledge Enterprise

1475 N. Scottsdale Road, Suite 200
Scottsdale, AZ 85287-3538
Phone: 480 884 1996 Fax: 480 884 1984

Case ID:M18-161P^
Published: 2/26/2020

Inventors

Jon Weller

Candace Chan

Contact

Shen Yan
shen.yan@skysonginnovations.com

Synthesis of Nanocrystalline Lanthanum Zirconate and Tape Casting of Films for Conversion to Lithium Lanthanum Zirconate

Li-ion batteries allow us to store electrochemical energy efficiently and safely. Indeed, these batteries have revolutionized fields ranging from portable and wearable electronics to grid-scale energy supply. Typically, Li-ion batteries operate by polarizing and transferring lithium ions through organic solvents or gels. Unfortunately, these systems suffer from low conductivity and are potentially dangerous due to the flammable nature of the organic solvent. Thin-films of lithium lanthanum zirconate (LLZO), a solid electrolyte, are a promising alternative, however, current manufacturing processes are only capable of producing large amorphous structures of LLZO. Therefore, an effective and efficient means of producing thin-films of LLZO is needed.

Researchers at Arizona State University have developed a means of producing thin-films of LLZO using an efficient and affordable method. Excitingly, the method produces ultrafine nanocrystals which can be dissolved in solvent to form a slurry and then easily tape-casted into thin ceramic films. Because the material operates as a solid-state system there are fewer possible side reactions while also being non-flammable. Essentially, this electrolyte material will address many of the weaknesses of conventional Li-ion ceramic electrolytes while maintaining the same caliber of performance.

This technology is covered by U.S. Pat. No. 11,084,734 and U.S. Pat. No. 11,760,652

Potential Applications:

- Li-ion Batteries
- Conductive Membranes

Benefits and Advantages:

- Nanosized- Opposed to traditional methods of synthesizing LLZO, the method developed by researchers produces nanosized particles which can be dissolved into slurries.
- Simplicity- The synthetic method is straightforward and cost effective.