



SURFACE MODIFIED LITHIUM MANGANESE OXIDE FOR LITHIUM EXTRACTION

ID# 2025-027

HIGHLIGHTS

- **Reusable:** Surface coating reduces manganese loss up to 50% for improved reusability
- **Superior Adsorption Capacity :** Up to 24 mg/g lithium uptake from low-concentration lithium
- **Optimized Design:** Nanoscale coating on 200+ mesh sorbent to maximize adsorption capacity
- **Environmental & Economic Sustainability:** Improve water quality and additional revenue

OPPORTUNITY

This advanced sorbent meets the growing lithium demand driven by EVs and energy storage, bypassing the limitations of traditional extraction methods. A nanoscale coating on a lithium manganese oxide sorbent enhances recyclability up to 50%. This stands to enable scalable, direct lithium extraction from formation waters and sedimentary brines, opening up new lithium sources in previously nonviable regions, effectively expanding lithium supply options for the battery manufacturing market.

COMPETITIVE ADVANTAGE

- **High Selectivity and Capacity:** The sorbent selectively targets lithium ions even in low-concentration brines, with performance optimized for formation waters.
- **Compatibility with Harsh Conditions:** Effective even in brines containing reductive agents, a common challenge in lithium-bearing waters from sedimentary sources.
- **Scalable and Environmentally-Friendly Solution:** Readily scalable to support large-scale lithium extraction. Enables adopters to meet environmental and sustainability goals.

STATUS

- Provisional US patent application filed
- [Shivakumar KR, Zolfaghari A, Safari S, Wu F, Bishop BA, Chen N, Robbins LJ, Alessi DS. Lithium extraction using zirconium oxide coated lithium manganese oxide ion-exchange adsorbents. Chemical Communications. 2025.](#)

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MORE INFORMATION

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