

# Recycling of Waste Zinc and Lithium Batteries to Recover Useful Products

## Introduction

The problem of spent Lithium, Zinc-C and Zn-MnO<sub>2</sub> battery waste generation is growing exponentially. Therefore, technology to recover useful and high-cost end products from batteries has been developed.

- Recovery of high-cost zinc compounds from spent alkaline batteries

The developed process converts the zinc waste into a high cost product, 2-methylimidazolate zinc salt or commonly known as ZIF-8. The process uses simple leaching and hydrothermal steps. At present, the commercial price of the recovered product is very expensive. The underlying economic benefits of the developed technology speak about the significance of this Waste-to-Wealth opportunity for the recycling industries.

- Recovery of pure Cobalt and other components from waste Lithium batteries

The developed process uses simple leaching and precipitation methods to selectively separate Cobalt from waste Lithium batteries. Cobalt constitutes a significant content of Lithium batteries and its recovery in reusable form is attractive from an economic point of view.

## Specifications of Recycled Products

- Zinc can be produced as highly porous ZnO, 2-methylimidazolate zinc salt with more than 99% purity.
- Cobalt can be produced as salts or oxides as per the requirement with more than 99% purity.

## Status

Field tested and technology transferred to an industry.



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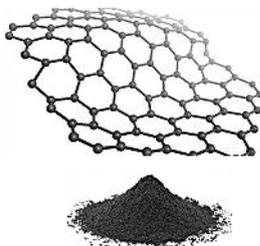
Used Lithium Batteries  
(Laptops, Cellphones, etc.)



Reusable  
Copper /  
Aluminum  
Foil



Carbon in  
form of  
Graphite /  
Graphene



High Purity  
Cobalt Salts  
or Cobalt  
Nanoproduct



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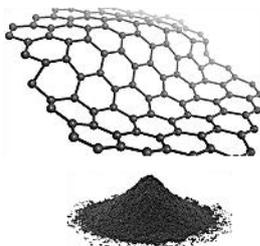
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