

BREAKING THE CONVENTIONAL LIMITS OF SPENT CATALYST RECYCLING

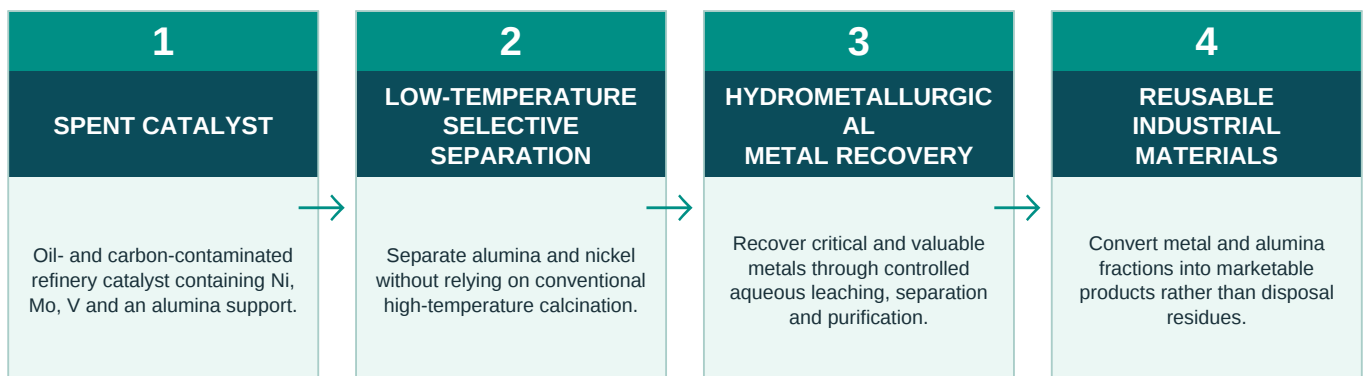
Commercialized low-temperature selective separation of alumina and nickel, combined with hydrometallurgical recovery of critical and valuable metals.

THE INDUSTRY'S UNRESOLVED PROBLEM

Conventional recycling processes recover only selected high-value metals such as molybdenum, vanadium, and nickel. The alumina-based catalyst support - often more than **50-60% of the total spent-catalyst weight** - is commonly left unrecovered, landfilled, or calcined at high temperature for limited use as low-value cement feedstock.

The result: high energy consumption, additional carbon emissions, loss of valuable alumina, and the generation of secondary residues instead of complete resource recovery.

MONOTECH'S INTEGRATED COMPLETE-RECOVERY SOLUTION



RECOVERED VALUE	TECHNOLOGY ADVANTAGES
Nickel products Nickel hydroxide and/or nickel salts Molybdenum products Molybdenum oxide or concentrates Vanadium products Vanadium-bearing oxides or salts Alumina fraction Recovered alumina or aluminium-hydroxide-based industrial materials	Lower-temperature operation Reduces dependence on energy-intensive thermal treatment. Selective separation Recovers both metal value and the dominant alumina support. Hydrometallurgical precision Separates and purifies critical and valuable metals in controlled aqueous processes. Reduced final waste Maximizes conversion of the whole catalyst into reusable industrial materials.

RECOVERING ONLY HIGH-VALUE METALS IS NOT COMPLETE RECYCLING.

True circularity requires the recovery of both critical metals and the alumina support.