

## Activating smarter, greener **CATALYST TECHNOLOGIES WITH NICKEL FOAM**



**More than 80% of chemical products rely on catalytic processes. Catalytic hydrogenation in continuous hydrogenation plays a vital role and has traditionally relied on metal catalysts with an oxidic carrier material or solid metal catalysts. However, as demand grows for more sustainable, economical alternatives, activated nickel foam now offers a smarter, cleaner solution.**

Manufactured from nearly pure nickel without any supporting element, activated nickel foam features low bulk density due to its highly porous, open cell structure which significantly enhances both catalytic activity and selectivity. Its large surface area enables greater contact between reactants and catalyst, accelerating reaction rates beyond what

traditional materials can achieve in fixed bed hydrogenation applications. The absence of acidic or basic centres leads to unprecedented selectivity towards hydrogenation only.

### **What is activated nickel foam?**

Until recently, activated nickel catalysts were only used in fixed bed applications in granular form, which has limited commercial usage, primarily for the hydrogenation of butynediol to butanediol. Evonik has set a new benchmark by adapting this proven technology into an activated nickel foam through its Metalyst® MC 9 series, manufactured under license from Alantum Europe GmbH.

The low-weight carrier-free foam solution delivers excellent mechanical stability and abrasion resistance, ensuring long-term durability under demanding process conditions. These properties enable activated nickel foam to outperform traditional catalyst formats in both efficiency and durability.

As well as offering greater performance, nickel foam is dust-free and ready-to-use, which minimizes plant downtime and improves operational safety.

Very lightweight due to porous, open cell structure

Enhanced activity and selectivity: Same product output with smaller quantities of catalyst

Low pressure drop and abrasion, excellent mechanical stability

Fully recoverable

Lower energy consumption and equipment wear

Very lightweight due to porous, open cell structure

The absence of an oxidic support simplifies reclamation and recycling procedures, reducing waste and facilitating recovery and reuse in line with circular economy principles. Additionally, the foam's low pressure drop reduces energy consumption and wear on downstream equipment, resulting in lower maintenance costs and a smaller environmental footprint.

### Higher conversion and selectivity

The customizable nature of nickel foam opens new possibilities for optimizing process design. Its high activity and minimal volume requirements allow for the use of smaller reactor beds, enabling a more compact, energy-efficient system. Plants can optimize internal reactor configurations without altering external infrastructure, offering a cost-effective path to modernization and sustainability.

By enabling tailored reactor configurations, nickel foam supports more agile and responsive chemical production. Evonik's Metalyst® MC 9 series has demonstrated exceptional performance across a range of hydrogenation reactions. In trials converting butynediol to butanediol, Metalyst® MC 911 achieved higher conversion and selectivity than incumbent granule catalysts at equal reactor bed volumes. In another study, Metalyst® MC 981 was tested in a two-stage reactor setup for the hydrogenation of isononanal to isononanol. Over 3,000 hours of operation, including stress tests with varying temperature and feed loads, the catalyst maintained stable performance, outperforming conventional alternatives due to its superior physico-chemical properties.

As chemical producers re-evaluate long-term strategies and shift toward more sustainable portfolios, activated nickel foam catalysts offer a compelling solution. They combine high efficiency, operational flexibility, and environmental benefits, delivering a competitive edge in a rapidly evolving market. With the Metalyst® MC 9 series now in pilot trials, Evonik is poised to redefine fixed bed hydrogenation and support the industry's transition to smarter, cleaner technologies.

To discover more about how Evonik Catalysts is driving a broad green agenda, click [here](#).

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