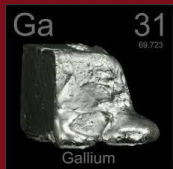




VANADIUM and GALLIUM RECOVERY from BAYER LIQUOR



Gallium and Vanadium production in EU and Worldwide



Worldwide **Ga** production:

- Is from **Bayer liquor** and zinc residue
- **Challenge:** BL must have **no/low Vanadium content**
- For BL with high V content: Ga/V co-extraction → not economically viable route for Ga extraction

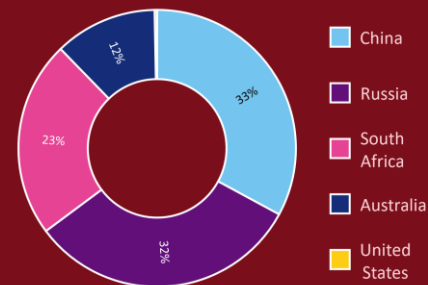


Today EU is 100% dependent on **V imports**

Currently, **no commercial solution is available** that can extract **Vanadium (V)** from **Bayer liquor** (without altering the quality of the Bayer liquor)



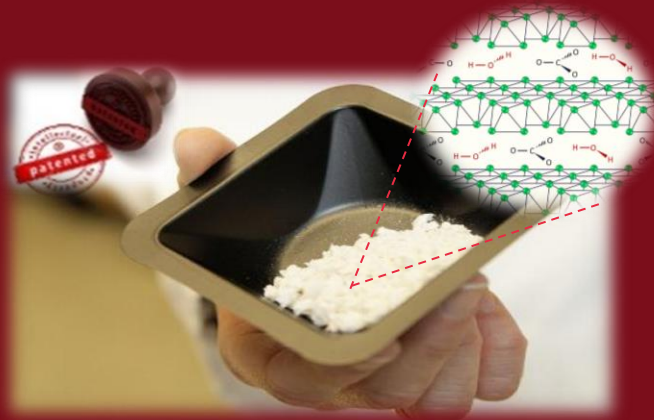
Alumina Production Europe



Develop and upscale an **innovative metallurgical process** that enables the **extraction and valorization** of purified

Vanadium (V) and **Gallium (Ga)** as by-products from the **Bayer process**
(bauxite processing) in **alumina refineries**

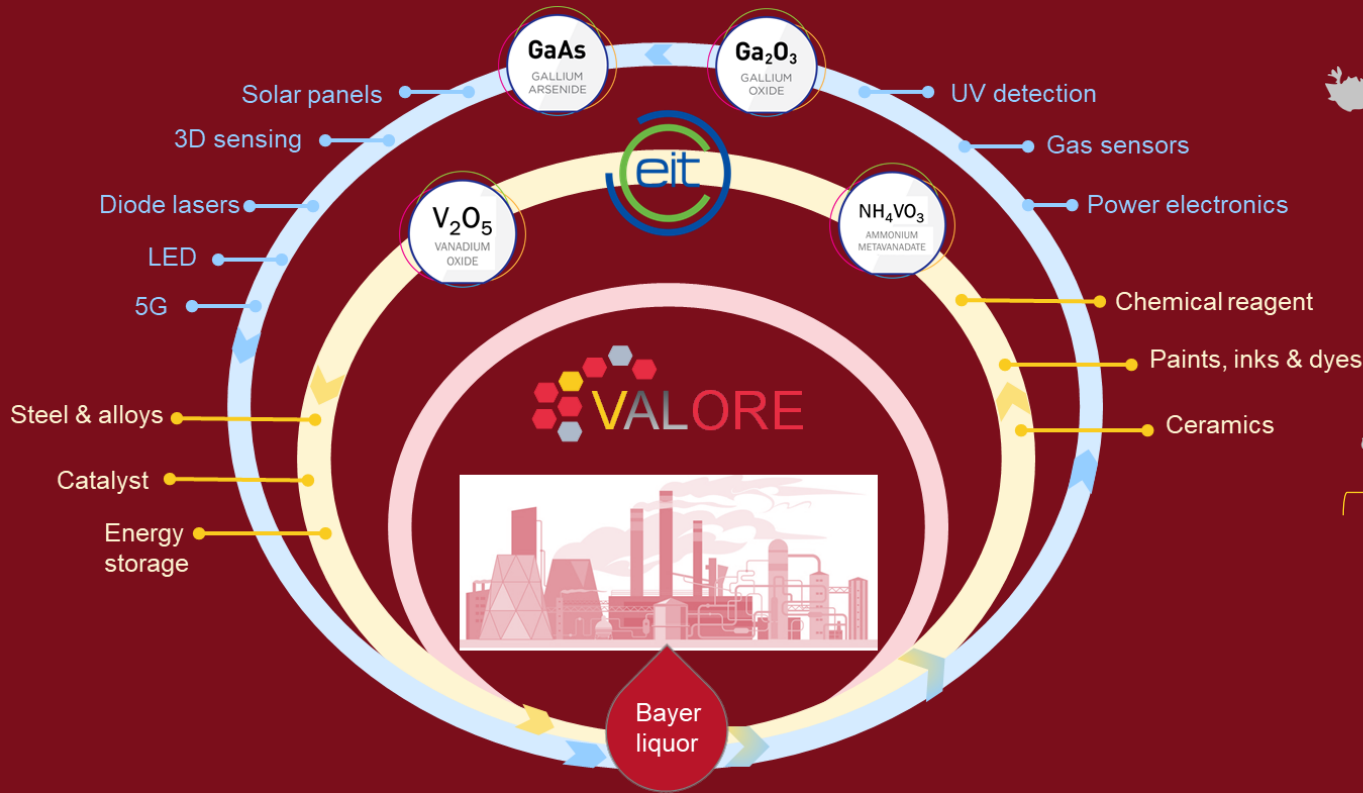
Regenerable solid phase extraction Sorbent and Process at high pH



- Selective for Vanadium recovery
- High alkaline stability
(long life performance and no leaching of elements which can alter the quality of the Bayer liquor)

Bayer Liquor (BL) results from bauxite processing at the alumina refinery

Alumina Production Europe



The Greek BL contains:

- 100 – 200 ppm V
- ~ 250 ppm Ga
- pH ≥ 14
- Currently Ga is not extracted due to the high V content

1) New source of V supply in EU

Vanadium Products
(>98% purity)



2) Economically viable Ga extraction

Gallium Products
(> 5N purity)

METAL
PRODUCTS

BUSINESS
MODEL

PROCESS

SORBENT

Thank you!



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