LUXFER
MEL TECHNOLOGIES

DATASHEET • 1075

Zirconia-Based Materials for Catalytic Conversions

Our capability

Luxfer MEL Technologies supplies both doped and undoped zirconium compounds (hydroxides and oxides) for a use in wide range of catalytic applications.

Materials are solid powders, with tunable properties resulting from our proprietary manufacturing processes. These are carried out at multi-ton scale.

Luxfer MEL Technologies also supplies zirconium solutions that are frequently used as binders (or indeed a Zr-source) in catalyst forming.

Advantages

Easy separation from reaction media

Catalysts can be easily separated from the reaction media.

High activity/low temperature operation

Good interaction with supported metals, and properties can be modified by dopants.

Structure

They have developed (tunable) porosity and defined crystalline structure.

Stability

Particularly under hydrothermal (aqueous) conditions, ideal for 'green' processes.

Reusability

Catalysts can be used several times during reaction cycle.

Environmentally friendly

Zirconia-based materials do not release any halogen containing compounds which might corrode equipment and/or impact the eco-system.

Typical dopants

Table 1.

Dopant	Property
Undoped	Amphoteric
SO_4, WO_3	Strong acidity
SiO_2, Al_2O_3	Mild acidity
MgO, La_2O_3	Basic
CeO_2	Redox

*Other dopants can potentially be worked with, e.g. transition metal oxides, other rare-earth oxides, SnO_2, Nb_2O_5.

Multiple dopants/combinations are also manufactured on a regular basis.

Physical properties

Table 2.

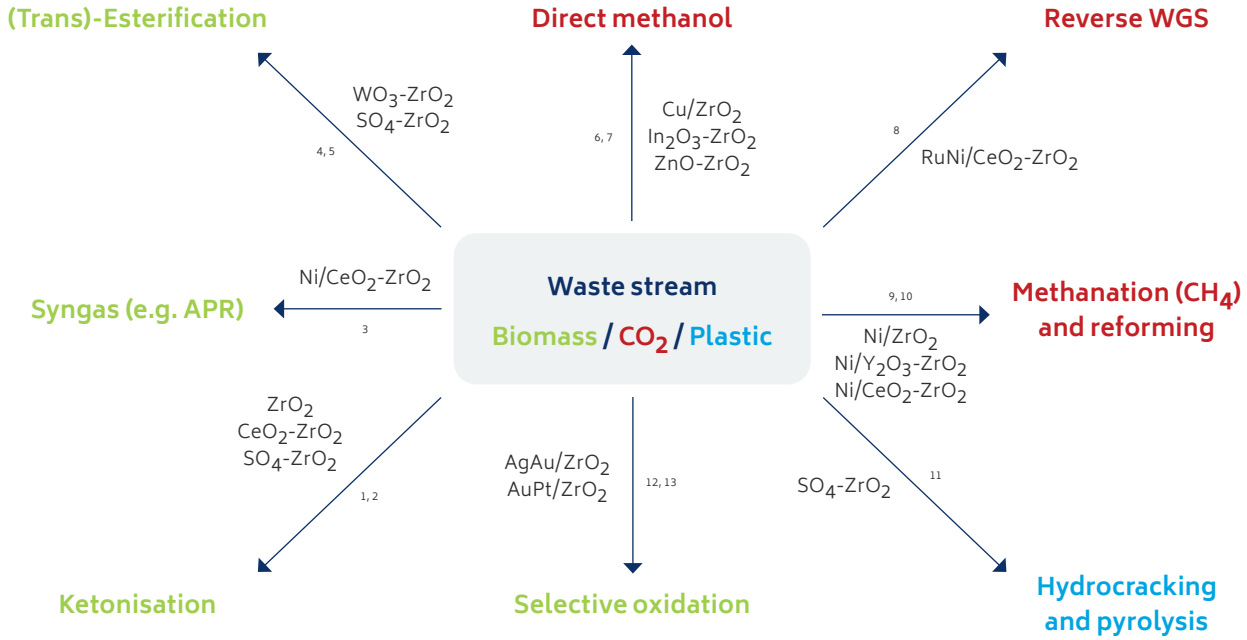
	Synthetic route			
	C1	C3	C4	New
D50 (µm)	~1 (A) ~25 (B)	~5	~25 (broad)	~20 (broad)
Porosity	Low	Med	High	Very high
Surface area	Med	Med	High	Very high
Active sites	Med	Med	High	Very high

*Active sites may refer to acidity for example.

Applications

Typically has involved isomerization of alkanes in gasoline upgrading (super-acid).

However, zirconia-based supports have attracted a lot of interest for "green" processes, for example cellulose conversion[14]. Other examples are shown below:



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