Zn/Mn spinel-based recovered sorbent for the removal of sulphur in gasification processes

CSIC and CIEMAT have developed and applied new materials for the removal of sulphur in gasification processes including biomass and waste gasification processes. The novel materials are obtained from recycled batteries and have a Zn-Mn spinel-based structure. Those novel materials outperformed sulphur removal capacities of a commercial ZnO-based sorbent at temperatures between 300-500ºC. Their higher sulphur removal capacity is attributed to their composition, to the presence of Mn and their specific Zn/Mn ratio.

Industrial partners are being sought to collaborate through a patent license agreement and/or R&D

An offer for Patent Licensing

High capacity sulphur removal sorbents

Removal of reduced sulfur species in gasification processes has been an issue since the 90s, mainly associated to comply with the environmental emission limits and to prevent equipment corrosion. More recently the focus is on comprehensive sulfur removal in biomass and waste gasification due to the key role of syngas and biogas as sources of hydrogen and biofuels.

Among the available technologies for desulphurization of syngas at temperatures at 300-500°C Zn-based oxides are the most widely used. However, under those conditions, ZnO tends to be reduced to elemental zinc, reducing its desulfurization capacity.

In this patent we propose the use of Zn-Mn binary oxides, recovered form recycled batteries as sorbents for the removal of sulphur in gasification gases, where the presence of manganese plays a crucial role providing stability and higher desulphurization capacity to the sorbents.

Main innovations and advantages

- Higher sulphur removal capacity than commercial ZnO based sorbents
- Utilization factor for sulphur removal higher than 78%
- The sorbents are produced in powder form from the black-mass of recycled alkaline and ZnC batteries, reducing batteries waste disposal
- The sorbents developed can be used for gas desulphurization at other temperature ranges, widen the applicability to biogas cleaning and upgrading processes
- Novel materials composition can be adjusted to optimize desulphurization properties of the sorbents

Patent Status
Priority patent application filed suitable for international extension

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