

Glycerol-based Solid Acid and Base Catalysts useful for the Esterification and Transesterification Processes

Title of Product/Process/Design/Equipment	Glycerol-based Solid Acid and Base Catalysts useful for the Esterification and Transesterification Processes
IPR Status Patent/Copyright/Trademark Secured in India/Abroad IPR Details	<ul style="list-style-type: none"> • US08445400 (21-05-2013) • AU2007357284 (26-07-2012) • Indonesia, IDP0032300 (13-11-2012) • Indian Patent Application No. 1624/DEL/07 dt. 01-08-2007 • German Patent Application No. DE112007003607 dt. 26/10/2007 • Indian Patent Application No. 2291DEL2011 dt. 08-12-2011
Application/Uses	<p>The glycerol-based carbon catalyst economically strengthens the biodiesel industry with new application to glycerol. The catalyst reduces the effluent load by avoiding sulfuric acid during esterification of free fatty acids present in indigenous non-edible oils for the preparation of biodiesel. The catalyst is very stable and can be recycled several times. In addition, the catalyst has been successfully employed as an efficient recyclable heterogeneous catalyst in a wide variety of synthetic methodologies, showing its versatility as a green catalyst and also a potential replacement to sulphuric acid. These catalyst based reactions may lead to cleaner industrial processes in several areas like oleochemicals, pharmaceuticals, nutraceuticals, lubricants, agrochemicals etc., by reducing liquid effluents. The catalyst was further modified as base catalyst for transesterification of oils to biodiesel.</p>
Salient Technical Features including Competing Features	The process involves Simultaneous carbonization and sulfonation of glycerol with sulfuric acid
Level/Scale of Development	100 g Glycerol/batch
Environmental Considerations	Residual sulphuric acid has to be removed from the product during the preparation of catalyst. However, the catalyst is a good replacement for sulphuric acid for variety of reactions, which leads to cleaner industrial processes. The base catalyst is a good replacement for alkali or alkoxides for transesterification process.

Status of Commercialization	Lab scale process is ready for commercial exploitation
Major Raw Materials to be Utilized	Glycerol, Sulfuric acid, Alkali
Major Plant Equipment and Machinery Required	Acid resistant STR Reactor
Techno-Economics	Technically and economically feasible
Technology Package	Available for lab scale process
Contact Details	Director, CSIR-Indian Institute of Chemical Technology, Tarnaka, Hyderabad - 500007, India. Phone: 91-40-27193030 Fax: 91-40-27160387 E-mail: director@iict.res.in
Photographs (please provide high quality photographs)	

For further information please contact

CSIR-Indian Institute of Chemical Technology
Uppal Road, Tarnaka, Hyderabad - 500 007 Telangana
E-mail: director@iict.res.in