

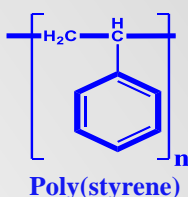
A SINGLE-STEP PRODUCTION OF STYRENE MONOMER BY USING HETEROGENEOUS CATALYST



Foam Sheets



Home appliances



Food containers



Automotive parts

The Institute has developed a single-step heterogeneous catalytic process for the production of styrene monomer. Styrene is a widely used monomer in polymer industries for the manufacturing of plastics, foams, automotive and home appliances. The commercial styrene production process suffers from disadvantages such as requiring multiple steps, catalyst deactivation, high energy consumption and low yield. To address the aforementioned problems, metal complex catalysed single-step oxidative coupling of benzene and ethylene to styrene have proposed. Although their catalytic activities are excellent, the development of low-cost, non-toxic and environmentally benign heterogeneous catalyst is essential to avoid the limitations of homogenous catalytic system. The invented technology provides good yield of styrene. The differentiation is achieved based on our atom-efficient high surface area heterogeneous catalysts.

TYPE OF COOPERATION

R&D cooperation and technology licensing opportunity

INTELLECTUAL PROPERTY

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DEVELOPED BY

Department of Catalysis and
Chemical Reaction Engineering

CONTACT

Knowledge Transfer Office
P: 00386 1 4760 529
E: knowledge.transfer@ki.si

MORE INFORMATION ABOUT THE INVENTION



Technology

The most widely practiced commercial technology for synthesis of styrene is the dehydrogenation of ethylbenzene, which is unsustainable and environmentally unfriendly. The invention is an atom-efficient high surface area heterogeneous catalyst made from widely available and cheap carbon-based materials. It enables efficient and sustainable catalytic routes for the production of styrene and can retain its activity after a number of cycles. This solution replaces the current multiple-step and energy-intensive industrial process of the styrene production with a single-step process by using heterogeneous catalyst under relatively mild operating conditions. The technology can be simply integrated into existing standard styrene production processes. We are now entering a pilot phase in a relevant industrial environment.

Main advantages

- The process does not need extremely toxic chemicals and costly catalysts.
- In contrast to the industrial process, the invented catalyst is easy to prepare and inexpensive.
- A single-step catalytic process, enable easy implementation of the technology into current industrial production processes.

Key words

Styrene, Monomer, Polymer production, Heterogeneous catalyst