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Optimizing Polymerization Reactions Using DMC Complexes as Catalysts

Focus Sectors
- Chemical Industry

Project Key Words
- Polymerisation
- DMC Catalyst
- Polyole

Development Status
- Proof of Concept finalized
- First lab scale-up finalized

Patent Procedure Status
- EP patent application filed

Chances for Cooperation
- Licensing
- Patent Sale
- R&D Cooperation

Innovation and Customer Benefit

Inductions periods are a known disadvantage in the application of double metal cyanide (DMC)-catalysts and can be a challenge in alkoxylation reaction processes
The actual state of the art does not offer a model which allows a prediction of the induction period. Knowing the duration of the same for a given DMC catalyst is of high importance as any abrupt temperature rise can be a severe security risk.
Our solution offers a procedure for producing a nanoscopic DMC catalyst and employing the same to optimize polymerisation reactions.
The main advantages the solution offers are:

- No induction period in polymerization reactions
- Reduced synthesis time
- No promoting agents needed
- Exclusive use of basic chemicals
- Reduction of security risks through warming-up or storage processes
- Clear end-product
- Low polydispersity

Possible Applications

The process generating double metal cyanide catalysts and employing these in polymerisation processes can be applied to any polyole production. As polyether polyoles are one of the most frequently used compounds, the range of possibilities include:

- Detergent Production
- Polyurethane Polyol Production
- Plasticizer Production

Technical Description

The new synthesis established for DMC-catalysts only employs basic chemicals and offers a safe and controlled solution to the challenges of polymerisation processes.

The synthesis is based on reacting a metal salt with a cyanometallate complex in the presence of an amphiphilic agent.

The result is a DMC-catalyst precursor that may be transferred into an active form by a thermal treatment that shows no induction period in PO-alkoxylations.

Fig. 1: Right hand side: end-product obtained by using optimized DMC complexes as catalysts

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