

## TOTAL PETROCHEMICALS

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## Total confirms successful operation of its Methanol-To-Olefins demonstration program - Samples of propylene made from methanol polymerized successfully into polypropylene

Total Petrochemicals has successfully started up its Methanol-to-Olefins (MTO) demonstration project in its research center in Feluy, Belgium. "Since a few weeks, we have been sampling monomers at the back end of the fractionation section. We produced successfully polypropylene of industrial quality out of it", announces Eric Duchesne, head of the MTO project. "This proves that the technology built and operated by Total Petrochemicals in conjunction with Honeywell's UOP, a refining and petrochemical technology developer and licensor, opens the way to a very efficient production of polyolefins based on methanol from alternative feedstock such as coal, natural gas or biomass."

The 45 million euro MTO demonstration plant inaugurated in October 2008 which is currently the Total Group's second largest research project next to the carbon capture and storage (CCS) project in Lacq, France, combines an Olefin Cracking Process (OCP) that is integrated in the methanol-to-olefins (MTO) technology. The MTO process, developed by UOP and Hydro, converts methanol into ethylene and propylene as well as heavy olefins. The OCP technology, developed by UOP and Total, uses a catalytic process to convert the heavy olefins into additional ethylene and propylene. The combined effluents are fractionated and purified into polymer-grade ethylene and propylene that can be converted into polyolefins at the nearby polymerization unit. An extensive demonstration program will continue with the on-line polymerization of the monomers as well as integration of the OCP and further optimization.

Several months of testing allowed Total Petrochemicals to first produce ethylene and propylene in 2009. Since then the technology and procedures were further developed and the polypropylene successfully polymerized. "We tested polypropylene with Ziegler-Natta and metallocene catalysts, obtaining very reliable industrial quality of products. Thus we have achieved a key milestone of this project, the production of polyethylene will complete the endeavour in the upcoming months", explains Eric Duchesne.

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The process is particularly attractive in a world where polypropylene demand growth is strong because approximately 60% of the olefins output from the production line is propylene, with the remainder ethylene. Total Petrochemicals is intended to demonstrate a more than 85% efficiency of the combined MTO-OCP process as the models predict. "That means more than 85% of the carbon entering the unit will come out as ethylene and propylene", Eric Duchesne says. "It is the highest carbon yield on the market. This is very important as such high carbon efficiency means less feedstock is needed to produce the final polymer", he says.

"The success of the Feluy project provides Total Petrochemicals with a technology and hands-on leadership on MTO/OCP technology", states François Cornélis, Vice President of the Executive Committee of Total and President Chemicals. "We will develop MTO/OCP projects with potential partners in coal or gas rich countries that are looking for developing their petrochemical industry based on their own raw materials." Total has already started discussions with potential partners.

