Live

Design of a 185 kilo tons per year low density polyethylene plant

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Polyethylene (PE) is one of the most used polymers worldwide and represents about one third of the overall plastics demand. Its wide span of applications arises from its simple structure paired with favorable properties like low density, low environmental impact and good chemical resistance. LDPE can be produced either in an autoclave reactor or in a tubular reactor via free radical polymerization. These high pressure processes operate at pressure of 1000 to 3000 bar and temperatures of 80 to 300 °C. The polymerization is initiated by oxygen or peroxides. To achieve the desired molecular weight distribution, chain transfer agents (CTA) are used as well as specific mixtures of different initiators. In this project it is desired to design a LDPE plant including Aspen Plus flow sheet, cost and energy analysis, reactor simulation with PREDICI as well as a HAZOP safety analysis. The presentation will cover this project with the focus on process engineering aspects which doesn't include deep insight into the chemistry behind the reactor. But for more detailed information regarding chemistry aspects I can provide a full report and contact information of our chemists.

Max Lampert is a mechanical and process engineer (B.Sc.) from Technical University of Darmstadt, Germany. During his Bachelor Thesis research he studied the systemization of information generation during product development cycles. In the first senior design research project he implemented a side stick for an Airbus flight simulator for research purposes and programmed its functions in the flight and guidance management computer (FGMC). His second senior design project was the design of a large scale low density polyethylene (LDPE) plant together with students from Technical University of Darmstadt (Germany), students from Provadis (Germany) and students from SDSMT (USA). As a cooperation between process engineers, chemists and chemical engineers this project was giving him directions for his future work. Max Lampert is currently working on his Master-Thesis research for Dr. Shende where he is investigating ultrasonic pretreatment for lignocellulosic biomass in order to improve the conversion to bio-oil products in a hydrothermal liquefaction (HTL) process. He is also designing a continuous HTL pilot scale system model in Aspen Plus. Energy and cost analysis will be done based on the model.

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