

## **An exciting world of polymers: Past, present and future**

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Today we produce about 300 million tons of polymers every year and polymers have become indispensable in the 21<sup>st</sup> century. However, until around the beginning of the last century, the scientific community did not believe that polymers even existed. It took almost 30 years to convince the scientific fraternity that polymers are long-chain molecules and they do exist. Among these, polyolefins contribute more than half of the total volume of polymers produced. The worldwide production of polyolefins is around 180 million tons per annum. Most of these polyolefins are produced by a reaction called “Insertion Polymerization”. Despite the seeming maturity, insertion polymerization reaction continues to surprise us with growing complexity and is young as ever.

My lecture will glance through significant milestones in the history of polymers, especially polyolefins. The three phases of olefin polymerization will be discussed to put the lecture in the right context.

Subsequently, the remaining challenges in metal-catalyzed olefin polymerization will be presented and global efforts to address those will be examined. I will present our contribution to this reaction, which will showcase our endeavor in insertion polymerization of difunctional olefins with ethylene to prepare functional polyethylene. A second case study on ultrahigh molecular weight polyethylene in disentangled state will be presented.

An attempt will be made to correlate how fundamental science can lead to a commercial product.