Plastics, which are basically polymer materials, are now an integral part of our daily lives: packaging, transport, textile, Hi-technology... Total Petrochemicals produces and develops useful lightweight and durable plastics that play a key role in the sustainable development of our world, making our lives easier, cleaner, safer and more enjoyable. These products include polyethylene, polypropylene, polystyrene but also since recently polylactic acid, a biopolymer based on a renewable raw material.

Plastics are produced by polymerizing monomer units (ethylene in the case of polyethylene) under certain temperature and pressure conditions and most of the time in the presence of a catalyst. Catalysts, and more particularly organometallic species, are the cornerstones of the production of these polymers. Since 1980, the polyolefin field has undergone a revolution with the development of single-site catalysts referred to as metallocenes. The metallocene catalyst technology helps produce polyolefins, which boast improved chemical and physical properties and are less heavy and less bulky than those traditionally produced.

Total Research Center-Qatar (TRC-Q) researchers, jointly with Total Petrochemicals Research and Development teams, prospect and develop new catalysts to design and manufacture innovative high-level performance plastics. The objective is to optimize the catalysts synthesis for industrial scale application and to produce such catalysts in high yields in the most efficient way. There is a direct relation between the catalyst structure and the polymer chemical and physical properties. The relation is investigated by changing the size and type of the catalyst substituents, metallic centers... (stere, electronic and symmetrical modifications of the catalysts), and studying the impact of such changes on the polymer microstructure.

A set of products has been selected to explain this relation and bring to light new advances in polyolefins and biopolymers catalysis.