

## **REACHES OF ADVANCED CHEMISTRY**

In our fast-moving world it is truly hard to understand which discoveries or inventions move science forward. But we think, that the most valuable inventions must be connected with any technology, because nowadays almost all aspects of our life are strongly connected with technology. And from our point of view the most famous invention is the scientific papers about metathesis and lithium-ion batteries.

First of all, let's talk about metathesis. It is needed to be noticed, how metathesis is connected with technologies. Reaction of metathesis is redistribution of alkyliden fragments in olefin molecules. [2] Mostly it is used for obtaining polypropylene which is used as insulating material for different types of electrical cables. [3] At first blush the reaction seems to be easy to implement, because all we need to do is to break two bonds inside the molecules and to form two new bonds between the separated parts. But the main problem is catalyst. There are two aspects to be mentioned: high cost and strict reaction conditions. For example, catalysts based on a  $\text{Re}_2\text{O}_7$  are too expensive and require high pressure (20-25 atmospheres), so it is not cost-effective to use them. But in 2005 were found out ruthenium catalysts, which are more stable in the solution and they increase the product yield, which makes them more cost-effective than the previous ones. For this invention Iv Shoven, Robert H. Grabbs and Richard R. Shrock were given the Nobel prize. [4]

The second great invention is lithium-ion battery. This small box is the thing we can't imagine our life without, because all the technical devices we use now have lithium-ion batteries. At the bottom of the mechanics of battery is oxidize-reducing reaction between such substances as  $\text{LiCoO}_2$ ,  $\text{LiMn}_2\text{O}_4$  or  $\text{LiFePO}_4$  and carbon. When a current is supplied to the battery, the lithium ions

separate from the cathode and build into the structure of carbon anode. They form carbides  $\text{Li}_6\text{C}$ . [5] And when we use the battery this process goes backwards. This amazing invention was made by Michael Stanley Whittingham in 1970. [4]

In conclusion, it is worth saying, that chemistry is the great science with thousands of years of history. It helps us every single day of our life, and it is a great credit to chemists who devoted all their lives, carrying experiments and trying to make this world more advanced. And we hope to continue the way to the brighter future that they started.

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