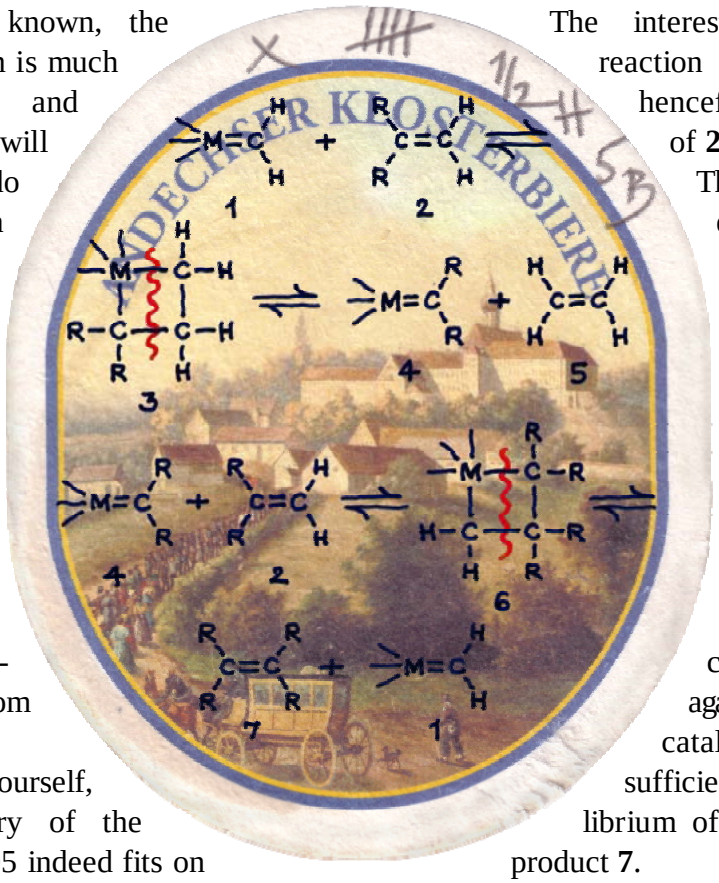
GENIUS, SIMPLE — SIMPLY GENIUS

Complexity of the Noble Prize in Chemistry of 2005 reduced to beer mat format

The Chemistry, for which the Noble Prize of 2005 was jointly awarded to the three scientists **Yves Chauvin**, **Robert H. Grubbs** and **Richard R. Schrock** "for the development of the metathesis methods in Organic synthesis," is best suited, as hardly any other one, to reduce the reluctance of the layman to deal with this science.

All those, who act in any kind as multiplier of chemical knowledge, should jump on this unique opportunity.

As is generally known, the German tax system is much too complicated and therefore it never will be possible to do one's taxes in writing on a beer mat, as was proposed by Friedrich Merz. However, with limited trouble, this is suitable for a problem of chemistry, a science which, traditionally, is regarded as far from simple.



Please, see for yourself, that the chemistry of the Noble prize of 2005 indeed fits on a beer mat.

Here the rules of the game: At carbon (C) always four bonds (lines) come out and at hydrogen (H) one bond. The letter R symbolizes an arbitrary single bound residue. The letter M in the catalyst symbolizes a metal (Cf.: tungsten) and the there out coming bonds here will not be defined in more detail. The substituents linked to the metal are in fact crucial for the success of the metathesis reaction, however they are not directly involved in the linkage of tow carbon fragments.

Now, let's consider the metathesis reaction itself (cf.: scheme on the beer mat): The catalyst **1** reacts with the olefin **2** obeying the valence rule (from carbon always four bonds come out) to square **3**. This intermediate may decompose backwards to give again **1** and **2**. However, there exists also the possibility of a decomposition into **4** and ethylene **5**, which escapes as by-product.

The interesting issue of this reaction is the fact, that henceforth in **4** the left part of **2** is linked to the metal. The system **4** is now equally reactive as **1** and ready reacts with **2** to yield square **6**, whose decomposition affords via carbon-carbon bond formation product **7**. The genius step in this connection is the fact that not only **7** is generated, but molecule **1** is regained and is again available. Therefore, catalytic amounts of **1** are sufficient, to shift the equilibrium of the reaction towards product **7**.

The metathesis reaction for the carbon-carbon bond formation impresses because of its enormous broadness of application and is applicable for the synthesis of pharmaceuticals and polymers, but also for the development of new materials.

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