

One step closer to green catalysis

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Mirror image catalysis with water in water is finally possible. Mirror image catalysis in water with water is effective and produces no waste. Researchers have now succeeded in imitating this marvelous trick of nature. NWO researchers Gerard Roelfes and Ben Feringa made a hybrid catalyst of metal complexes and DNA. This catalyst allows the selective formation of a single mirror image molecule in a chemical reaction with water in water. The journal *Nature Chemistry* published the results of the investigation.

Feringa and Roelfes created a biologically inspired catalyst. It consists partly of [metal complexes](#), as is the case with many traditional catalysts, and partly of DNA. PhD student Arnold Boersma accidentally discovered the reaction with water that selectively creates single mirror image forms of a molecule. Although it's not yet completely clear how exactly this reaction takes place, it is clear that the DNA plays a crucial role. The reaction takes place near the [DNA structure](#), because the metal complex responsible for the catalysis is attached to the DNA. The molecules created in this reaction would appear to sense the presence of the DNA. Catalysts are very important in chemistry: they help convert one material into another.

Selectively creating mirror image forms

Some molecules have two mirror image forms. But often only one of those mirror image forms is usable — for example, as a building block for medicines. Scientists have been able to create mirror image forms selectively for some time now, but no one had ever managed to do this

using water as the substance that causes the reaction, and using water as the solvent. Water's big advantage is that, in some reactions, it yields virtually no waste, unlike the substances currently in use.

Although water is a seemingly simple molecule, it has complex properties and for this reason is difficult to use in mirror image catalysis. It does, however, form the foundation for one of the cleanest forms of [catalysis](#). Using water to create [mirror image](#) forms of [molecules](#) selectively is very attractive because nothing else needs then to be changed or added. In such a reaction, fewer byproducts are formed. The DNA-based catalyst allows the selective reactions to take place using water as the solvent and as the reagent. Moreover, the new hybrid [catalyst](#) is easy to recycle.

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