Green Olefins from Renewable Materials: Prospects for the Post Oil Era

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Experts predict the earth's crude oil reserves will last another 40-70 years. The era of "green gold" will begin at that point, replacing "black gold" as a raw material source. The most important basic chemical derived from crude oil is ethylene, which is processed in complex value creation chains to create important mass-market products such as plastics, dyes, textiles, detergents and adhesives. About 30% of all petrochemicals are derived from ethylene. Ethylene could be considered one of the chemical pillars of our material prosperity. We have optimised a process that is currently the most promising approach for ensuring the continued supply of lightweight olefins from renewable resources. By cracking glycerol, a chemical component of all vegetable oils and animal fats, at 700°C using a special catalyst, we obtained ethylene and propene, exceeding the yields described in the literature three times over. The real high point of our work is the realisation that this process can also be applied to vegetable oils without converting them first. We were successful in obtaining yields of 600 – 700 ml per gram of vegetable oil containing more than 40% of the green olefins ethylene and propene through catalytic cracking. To our knowledge, no one has previously been successful in doing this using this method or with this degree of efficiency. It even works with old frying oil, which - thanks to our method - could go from being a disposable product to a valuable resource.