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Sustainable Bioplastics

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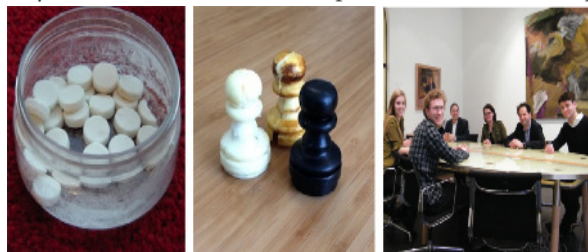


Gadi Rothenberg

University of Amsterdam, Netherlands

Plantics: Plastics made from plants

How often is it that you invent something that can truly change people's lives and make the world a better place? We've been working on catalyst discovery and development for bulk chemicals and sustainable energy for over a decade, and during those years we found quite a few nice things, but nothing truly spectacular. And then, five years ago, we discovered by accident a new type of biodegradable polymer made from 100% plant-based materials. It would be nice to say that this involved years of study and preparation, but in fact we were just very lucky. This new plastic is inherently non-toxic and non-hazardous. Excitingly, it is cheap enough to replace polyurethane and in some cases polypropylene and PET on a kilogram to kilogram basis (see Figure 1). It is now being manufactured on ton scale by a spin-off company, Plantics BV, which is situated at the Port of Amsterdam. During the scaling up and manufacturing we have found a host of new and exciting things. In the lecture, I will tell you how we discovered this plastic, and discuss the pros and cons of making chemicals and polymers from biomass. I will



also show examples of this new type of plastics and share our stories of trying to bring a new material into the conservative industrial sectors of injection moulding, agro-products, building materials and oil drilling additives.

Figure 1. Left: Pellets of our bioplastic that can be used in injection moulding or compression moulding. **Centre:** solid chess pawns pressed from the bioplastic (the black color is achieved by mixing 1 wt% of carbon black into the polymer mixture).

Right: A conference table which was made from the bioplastic, in collaboration with product design students of the Amsterdam University of Applied Sciences.

Biography

Gadi Rothenberg has obtained his BSc in Chemistry in 1993, and PhD in Applied Chemistry from the Hebrew University of Jerusalem in Israel in 1999. He was a Marie Curie Fellow at the University of York (UK) and moved to the University of Amsterdam, where he is now a Professor and Chair of Heterogeneous Catalysis and Sustainable Chemistry at the Van 't Hoff Institute for Molecular Sciences. He also teaches courses on catalysis, thermodynamics and scientific writing. He has published two books and over 160 papers in peer-reviewed journals. His textbook "Catalysis: Concepts & Green Applications" is a Wiley-VCH bestseller. He has also invented 15 patents, and co-founded the companies like Sorbisense A/S, Yellow Diesel BV and Plantics BV. His latest inventions are a new catalyst for cleaning cyanide from wastewater and a metal-free super-capacitor material.

g.rothenberg@uva.nl