



Biodegradable Si-compounds – an essential ingredient for future food packagings to reduce plastic waste

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There is still a long way to go towards a sustainable economy. The recyclability of multi-layer polymer films for packaging purposes based on mineral oil has to be increased significantly. On a long-term view a scientific and financial effort has to be undertaken towards a bio-based industry.

Although there is a market need for bio-based as well as bio-degradable packing films to reduce future plastic waste, it is difficult to push alternative packaging solutions into the market. At present they are obstructed due to their limited performance and their considerably higher production costs compared to conventional films.

The Fraunhofer Institute for Silicate Research ISC has been developed innovative solutions for a sustainable economy for many years and contributes to reduce environmental pollution caused by plastic waste. A strategic goal is the synthesis of Si-containing precursors for biodegradable organic-inorganic hybrid materials based on bio-ingredients extracted from residues of food industry. Such compounds derived from natural resources are utilized to develop innovative concepts for barrier coatings on packaging films. Therefore functionalized biopolymers and new Si-C-containing precursors have been synthesized for lacquer syntheses.

An armoring very dense network structure in the final coatings preserves the quality of packed food and prevents oxygen, water vapour and flavours from permeating through the packaging films. Beneficially the new materials do not compete with food consumption and energy production.

These bio-based and/or biodegradable functional coatings show the potential to overcome the shortcomings of today's packaging films based on biopolymers by increasing their barrier properties and thereby enhancing the shelf life of packed products. And the films and coatings can be either recycled or composted after utilization. Furthermore various opportunities for new applications in different market segments open up.

