



Novel surface modification approaches for the production of renewable starch-based barrier coatings

A 30 credit (20 weeks) diploma work (master student) at YKI, Institute for Surface Chemistry.

Background

The high oil prices and the increased environmental awareness at both the public and governmental level have generated a strong drive to substitute the oil-derived polymeric materials used in packaging applications by cheaper, bio-derived and/or bio-degradable alternatives. Despite the great progress that has been made over the last decade, in particular in the area of surface coatings, many scientific and technological challenges remain to be met and tackled before bio-derived/degradable polymeric materials become a real alternative to petrochemical-based polymers both in terms of performance and cost. In many cases the functionality of biopolymer surfaces has the potential to be increased by effecting surface modifications. Such modifications may be of a chemical nature such as those which have been carried out on starch-based coatings by means of diverse plasma treatments. Further, these modifications may also involve changes of the surface roughness which could be used as a means of, e.g., inducing extreme non-wettability or “superhydrophobicity”. This in turn can be done by means of a range of techniques, such as, colloidal self assembly, electrospinning and plasma etching/deposition. Previous work on electrospinning of wheat gluten to improve barrier properties of wheat gluten films has shown promising results. The potential of this technique for the modification of the surface of starch-based films has, however, not been fully exploited.

Project description

The project aims at assessing the potential of electrospinning and plasma treatment as surface modification approaches for the production of renewable starch-based coatings with improved resistance against penetration of oxygen and moisture.

Practical information

Requirements: Chemistry or Chemical Engineering education at university level.

One passed course in Colloid and Surface Chemistry and/or Polymer Technology (or related topics). Starting date: August 2010. Duration: 20 weeks

For further information please contact:

e-mail: Isabel Mira (YKI)- isabel.mira@yki.se

Josefina Lindqvist Hoffmann (YKI) – josefina.lindqvist@yki.se

Mikael Hedenqvist (KTH) - mikaelhe@polymer.kth.se

YKI, Institute for Surface Chemistry is the internationally leading industrial research institute in applied surface and colloid chemistry. YKI's clients come from many industrial sectors e.g. pharmaceuticals, biotechnology, food, industrial chemicals, household products, engineering, pulp and paper, coatings, ceramics, adhesives, paint, ink and printing. The 40 member companies in YKI include world leaders in these industrial sectors. 50 % of our industrial partners are based outside Sweden.

YKI has around 65 employees and is located in a research-intensive area on the campus of the Royal Technical University (KTH) in Stockholm. YKI is a member of the SP-Group. For further information please visit our website www.yki.se