



Advancing Coatings with Biotechnology

Guest Editor:

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Deadline for manuscript submissions:
23 December 2014

Special Issue website:
mdpi.com/si/coatings/coatings-biotech



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Dear Colleagues,

Biotechnology has revolutionized many industries. It will dramatically impact the coating industry as well by creating biocoatings with functionality far beyond today's polymer coatings. A special issue of *Coatings* combining biotechnology and coatings has never before been published. This issue will highlight advances in colloid and polymer materials, enzyme and microbial biotechnology that will dramatically transform the functionality of waterborne coatings using the selectivity and reactivity of biology. Biocoatings have been demonstrated in laboratory studies that preserve and stabilize the reactivity of enzymes, biomolecules (pigments, nucleic acids, proteins) or reactive microbes (bacteria, yeast, fungi, archaea, algae) for hundreds to thousands of hours. Biocoatings can react to chemicals in the environment and degrade toxins; others are photoreactive producing or consuming gasses using solar energy. Some can be used as biocatalysts for chiral chemical transformations in aqueous or multi-phase systems, while others sense their environment (color change, luminesce, fluoresce) or self-tune to incident light intensity. There is a very significant gap between these academic demonstrations and the information needed for development of commercial biocoatings. Methods are needed for waterborne biocoating formulation, drying/curing without inactivation, wet adhesion, and optimization of nanoporosity. Modeling of the porosity, stability and reactivity of single or multi-component biocoatings is lacking. Close collaboration is needed between academic and industrial developers in the next 5 to 10 years to establish standards for measuring coating safety and stability for biocoatings to become commercial products proven in the market. This issue will highlight both the advances and the many challenges for commercial development of coatings utilizing biotechnology. Please contact me if you wish to discuss your contribution to this first special issue on Advancing Coatings with Biotechnology.

Prof. Michael C. Flickinger

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Special Issue Topics:

- reactive enzyme coatings
- biocatalytic coatings
- photoreactive biocoatings
- biocatalytic plastics
- waterborne biocoatings
- smart coatings using biotechnology
- bioreactive polymer coatings