

Green Chemistry applications for the Manufacturing Industry

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Abstract

Sustainability has become an important issue in all spheres of life, focusing on the safeguard of people's life, environmental protection and natural resources exploitation. Companies around the world are showing increasing interest in environmentally friendly manufacturing.

Our research Team is actively engaged in the development of a new class of green chemical compounds which may be used to improve environmental sustainability of a variety of products/processes designed with a circular economy approach.

We will report the use of a new class of active cross-linking agents (ACL) which can be employed to produce non-toxic metal free leather, antifouling paints, active packaging.

The great potential of ACL is embedded in their multiple applications. These activators can link together different molecules or functional groups with a "lock and key" mechanism, similarly to enzymes or catalysts so that no trace of the ACL is left in the final product after reaction.

Few examples of the importance of this outstanding feature will be given concerning leather manufacturing and antimicrobial packaging production.

As far as leather production is concerned, the fundamental and unprecedented difference between conventional tanning agents and ACL is that the latter act as "catalysts" and are not retained in leather after tanning. They stabilize the collagen structure, allowing to produce high quality tanned leather which is devoid chemicals and is thus non-toxic (Figure 1). Main environmental benefits derive from the absence of chrome slurries, reduction in chemical consumption and hazard.

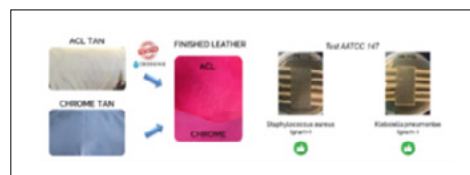


Figure 1. Examples of ACL tanned leather and antimicrobial packaging.

As far as packaging is concerned ACL can be employed to produce a spray coating which endows the treated surface with antimicrobial, hydrophobic, gas impermeability according to the application required (Figure 1). In this connection, the use of these permanent and non-releasing packaging allows prolonged shelf life and healthier food for the consumer.

Biography

Valentina Beghetto is senior Assistant Professor at the University Ca' Foscari Venice, Department of Molecular Sciences (DSMN), has over 90 among publications, patents and congress communications. Responsible of the third mission and technology transfer for DSMN, she is coordinator and partner of various National and European projects dealing with environmentally friendly technologies from biomass products and Circular Economy Best Practices. She teaches Polymer Chemistry, Asymmetric Synthesis, Chemistry for the Leather Industry, Flavor and Fragrances for undergraduates in Sustainable Chemistry. Coordinator of a research group of 10 people, carries out consulting activities for different manufacturing companies. Since 2014 founder of Crossing Ltd Winner of many awards specialized in innovative products/processes for sustainable manufacturing processes regarding non-toxic leather, antimicrobial coatings and paints for food packaging, textile, etc.

Publications:

1. Valentina Beghetto, Vanessa Gatto, Silvia Conca, Noemi Bardella, Chiara Buranello, Giulia Gasparetto, CARBOHYDRATE POLYMERS, 2020, vol. 249, pp. 116810-116820
2. Beghetto Valentina; Agostinis Lodovico; Cat Vanessa; Samiolo Riccardo; JOURNAL OF CLEANER PRODUCTION, 2019, vol. 220, pp. 864-872

9th World Congress on Green Chemistry and Green Energy | Rome | Italy | 28-29 February | 2020 |

Abstract Citation: Beghetto Valentina, *Green Chemistry applications for the Manufacturing Industry*, Green Chemistry 2020, 9th World Congress on Green Chemistry and Green Energy, Rome, Italy, 28-29 February, 2020, 04