

Lignin based materials from small scale to industrial formulations

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The valorization of waste residues or by products is of growing demand in the current society both from consumers side and policy makers. In this respect biobased materials are in the spotlight. The society is more concerned about environment not only in regard to recycling but also to make the economy circular and valorize the residues.

Lignin is the most abundant natural source of phenolic compounds on Earth. It is mass produced as a by-product of, for example, the manufacture of wood pulp and paper but also from bioethanol producers. However, most of this lignin was burnt up to last year, which means that the material is mainly valorised energetically. VITO believes in the potential for upgrading lignin beyond energy use only and is working in this area since 2013, and as a coinitiator of Biorizon, in close contacts with many different players in the field.

Since lignin has much more potential as a so-called bio-aromatic, developments are moving fast now. It can replace many aromatics of fossil origin in the chemical industry, such as the basic chemicals phenol and bisphenol A. The latter are intermediate raw materials that have a wide range of applications in various sectors, from construction to mobility and transport. But Lignin use is not limited to only those applications, it can also be used for polyurethane materials (PU) or acrylates for applications such as foams, adhesives or sealants. Lignin has a great potential to be applied in a broad range of applications. Therefore a rational decision tree on lignin down processing, treatment, modification and formulation is crucial.

A close collaboration between manufacturing industry and academia or research centers is a must to make the transition towards sustainable materials. It is not only important to obtain good material properties at a laboratory scale but also to apply such knowledge in real samples applying industry's formulations. We will highlight some developments in this area including the need to work over the value chain.