

# Wood Chemistry



## Chemical utilisation of wood and wood composites



### Biorefinery concepts for biomass processing in the South Africa

The project focuses on the development of technologies and processes for integration into a biorefinery for the production of a range of valuable products from wood-based raw materials from the forestry and other biomass utilisation sectors in South Africa.

The project, which is done in conjunction with the Department of Process Engineering focuses in particular on the development of novel environmentally friendly biomass fractionation technologies aimed at obtaining the original biomass components i.e. cellulose, hemicelluloses, lignin and extractives in high yield and high quality for further downstream processing. The fractionation technologies under investigation include the use of green solvents, ionic liquids and improved existing methods such as alkaline and organosolv techniques, to produce specialty hemicellulose biopolymers, novel cellulosic products and renewable energy from locally available biomass feedstocks. The ultimate goal was to develop technologies that will allow the biomass utilising industries such as the pulp and paper and the sugar milling industries to produce new products in the form of specialty organic polymers, and cellulosic products with new functional properties for specialised industrial applications

### Phosphate bonded wood composites

The project is funded by the Paper Manufacturers Association of South Africa (PAMSA) and includes the four sub-projects listed below, which are being carried out by MSc students:

1. Targeted modification and application of hemicellulose to diversify functional properties of cellulose-based products for novel application.
2. Conversion of *E. grandis* biomass residues into valuable bioenergy products through thermo-chemical processing (pyrolysis).
3. Energy products from pulp mill sludge.
4. Characterisation of lignin carbohydrate complexes.