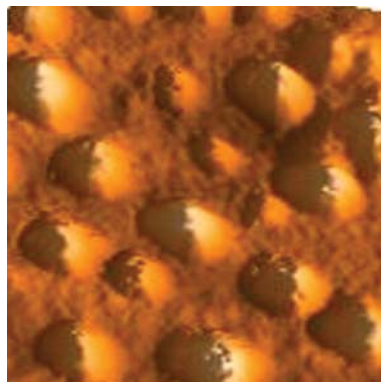




Surface Degradation Fibre Analysis Bio-fuels

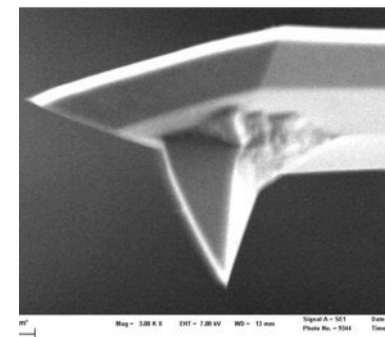


A low-cost pyrolysis unit for safe charcoal production

A low cost pyrolysis unit was developed to produce charcoal from wood waste. The coal was blended with a fire-retarder (soil) to reduce the burning temperature and prolong the burning time. In this way the charcoal can be sufficiently used for cooking, but at the same time the danger of shack-fires is significantly reduced.

Time/temperature combustion profiles

Time/temperature profiles of various biofuels were recorded during combustion to determine parameters, such as the maximum temperature, the coal temperature and the time it takes to reach the etc. This allows a direct comparison of different biofuels and an optimization of the fuel, e.g. for domestic or industrial use.



Ageing studies of wood and model-compounds

Surfaces of wood, cellulose and lignin films were exposed to sunlight for short times and the surface modifications determined with AFM. It was found that modifications started after very short exposure times of around one hour and also that cellulose and lignin films could act as model compounds to predict the ageing behavior of wood. This finding is important for the coating industry, as it is much easier to do ageing studies on films prepared from cellulose or lignin than on native wood surfaces.

Chemical composition of fibre surfaces

The distribution of cellulose and lignin on fibre surfaces was determined with AFM using chemically modified tips. This technique allowed the localization and quantification of cellulose and lignin and therefore a comparison of wood fibres from different species and even from different growth sites. The results are of interest to the pulping industry, because often fibres from different species are pulped together and in some cases this led to a rather low yield. This study showed that it might be beneficial to pulp only fibres together that have a similar composition.