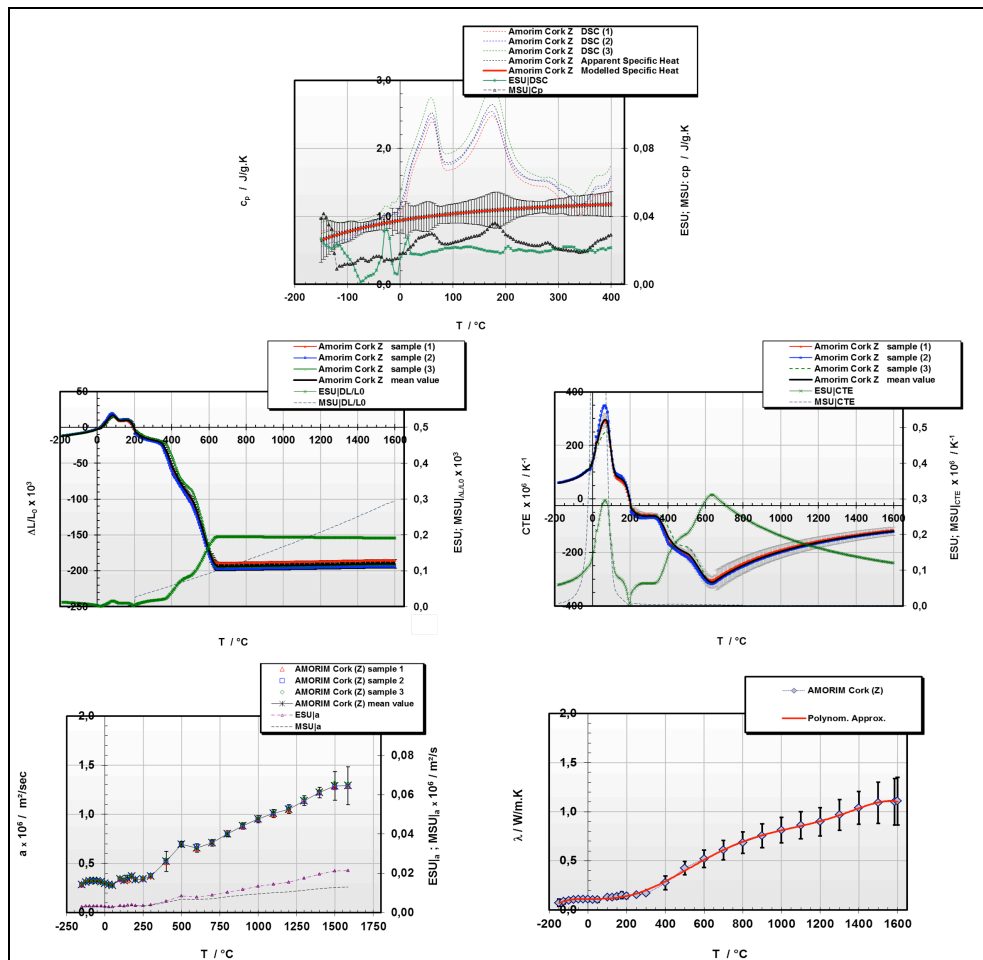


Thermophysical Properties of Un-Charred Cork

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Cork is used for many matters. The thermo-physical investigations reported in this contribution were done with special emphasis to the planned use of cork as an ablation material in space craft applications. Despite the fact that cork is a natural product which shows various chemically induced modifications when thermally treated, it shows a remarkable mechanical stability – minimum up to the maximum measuring temperature of 1600°C. An initial pre-testing thermo-gravimetric inspection verified beginning of chemical modification at temperatures near 200°C. Denaturation of constituents strongly depends from the gas environment. Even under inert atmosphere the oxygen content of the cork sample gives rise to a mass loss of about 60%. Up to 400°C denaturation characteristics are observed more or the less independent from the gas background. Thus thermo-physical data of the un-charred cork are expected to be representative up to 400°C even when they are measured under inert conditions. Measurement of apparent specific heat, thermal expansion and thermal diffusivity were performed in a temperature range [-150°C, 1600°C]. Referring to chemical reactions specific heat is examined from DSC data up to denaturation onset. A c_p master-curve from sapphire is used to extrapolate specific heat up to 400°C. Detailed uncertainty estimation is given [1;2], which distinguishes sample related effects from those traceable back to the equipment and/or to the examining models.



- [1] ENV 13005; Guide to the expression of uncertainty in measurement (1999)
- [2] W. Hohenauer; A Proposal to reduce GUM's Recommendations to Practice in Flash Methods, Proc. Thermophysics 2013, pp 18-23, Slovak Academy of Science in Bratislava (2013)