# TRACKING MOLECULAR STRUCTURES AS A FUNCTION OF TIME AND TEMPERATURE VIA SIMULTANEOUS RHEOMETRY AND FT-IR SPECTROSCOPY

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Obtaining comprehensive insight of a materials behavior in regards to specific product and/ or process related issues generally demands for more than just one analytical technique.
For many industrial applications FT-IR spectroscopy is the analytical technique of choice to meaningfully complement rheometry. Combining these techniques in just one instrument instead of operating in parallel, multiple material characteristics can be detected simultaneously, thus maximizing and synchronizing the information gathered from a single measurement.
In this contribution we present new results obtained with the *RHEONAUT* module, a module which couples a *Thermo Scientific HAAKE MARS* rheometer with e.g. a *Thermo Scientific Nicolet iS10* FT-IR spectrometer.
The patented *RHEONAUT* module consists of an optical unit which is fully integrated in a peltier or electrical temperature controlled base plate. Infrared data is collected using the ATR (attenuated total reflection) principle. Thus, detailed information on the molecular architecture of the sample can be investigated *in situ* simultaneously to its rheological behaviour.
For the investigation of polymerization processes, the change of functional groups of the respective reactants can be monitored as well as e.g. the formation and depletion of hydrogen bonds. In addition to that the (long term) stability of chemical structures such as the enzymatic or hydrolytic structural interruptions of biopolymers can be validated.
Details of this unique new set-up as well as selected results on e.g. the temperature dependent sol-gel-transition of gelatin networks will be presented.