News Story from: **IIC Dr. Kuhn**
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A new quality control tool for the rubber industry

Magnetic Resonance Crosslink Density Spectrometer provides cross-link density and the type of cross-linking, major parameters determining the mechanical and aging properties of technical rubbers

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A New Tool for Quality Control in Rubber and Polymer Industry: the first Magnetic Resonance Crosslink Density Spectrometer: cross-link density and the type of cross-linking are major parameters determining the mechanical and aging properties of technical rubbers. Imperfect curing of rubbers may lead to cross-link density inhomogeneities and consequently, to variations of the quality of the rubber product, or makes it even unusable. Additionally, mechanical, thermal or oxidative aging processes may cause local changes of the cross-link density, and lead in the advanced state to chemical degradation of the network structure.

To improve the constant quality of elastomer products, to support the manufacturer of rubber products in reducing costs caused by loss through waste The recently introduced fully digital low cost and very compact Magnetic Resonance system with dedicated features for quality control and quality assurance in rubber testing is particularly suitable for routine on-line quality tests, but also for R and D purposes.

Using the IIC Magnetic Resonance Cross-link Density Spectrometer MR-CDS 3500-D, measurements of physical and chemical cross-link density for all types of rubbers can be performed in full automation mode within typically 3 to 15 minutes, with a standard deviation of less than 3%.

No chemical sample preparation is required; samples are measured in native state.

Additionally, NMR relaxation parameters such as T1, T2 or T1r can be determined and used for a more detailed characterisation of the mobility of the elastomer network, eg filler-matrix interactions, aging processes, oils and other organic compounds typically found in rubbers.

Quick and accurate information on curing performance, chemical and physical cross-link density (XLD) and its inhomogeneities can be obtained.

Simultaneous XLD measurements during the vulcanisation process may provide a new insight into rubber curing and will contribute to the optimisation of rubber processing parameters.

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