New industrial procedure for characterization of elastomeric latex in real time

The Spanish National Research Council has developed a simple and economical procedure for a complete characterization of latex manufacturing process, from quality control of raw material, following with pre-vulcanization up to post-vulcanization. Since this procedure is achieved in a low field MNR, a high degree of automation can be achieved. Polymer networks can be analysed both, in aqueous dispersion, i.e. latex state or dry samples minimizing sample handling and allowing measurements on real time.

An industrial partner for a license agreement is sought

Samples can be analysed in latex state

Currently, in latex industry procedures for characterization of manufacturing process are indirect since the breakage of latex colloidal system is required in order to produce films to be analysed. These avoid real-time control and only provide qualitative information about cross-link density.

The CSIC has developed a procedure based on low field MNR for complete and quantitative characterization of crosslinking network including number of cross-links, their spatial distribution and the number of non-elastic network defects along the whole manufacturing process. Either samples in aqueous dispersion (latex state) or dry samples (final part) can be analysed minimizing sample handling.

In the first stage, quality control of raw material, a complete analysis of solid content can be achieved by introducing an aliquot of latex in NMR tube. Characterization of network structure is performed by proton double quantum NMR experiments.

This development will mark a milestone for latex industry.

Main applications and advantages

- **Reliable and fast:** samples can be analysed as they are obtained in each stage of manufacturing process, even in latex state or dry samples.
- **Economical and simple:** experiments are performed in a low field NMR spectrometer, this is a very common industrial equipment for quality control therefore it's robust, compact, inexpensive and no qualified personal is needed.
- **Automatable:** the equipment can be configured according to particular needs of each industry.
- **Environmentally friendly:** no solvents are required since there is no need to produce films for analyzing.

Patent Status

Spanish patent and international extension (PCT) filed.

For further information, please contact

Patricia Thomas V, Ph.D.
Material Science Area
Deputy Vice-Presidency for Knowledge Transfer
Spanish National Research Council (CSIC)
Tel.: + 34 – 91 561 34 41
Fax: + 34 – 91 564 48 53
E-mail: patricia.thomas@ictp.csic.es