

Analysis of Conditions of Curable Resin by Use of Pulse NMR (Nuclear Magnetic Resonance)

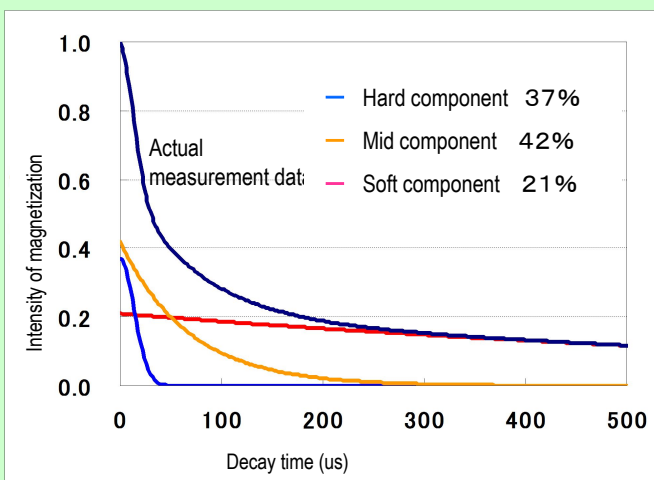
Summary

It is possible to compare the degree of hardening of epoxy and other thermoplastic resins and analyze the hardening process from the changes in the molecular mobility by using pulse NMR.

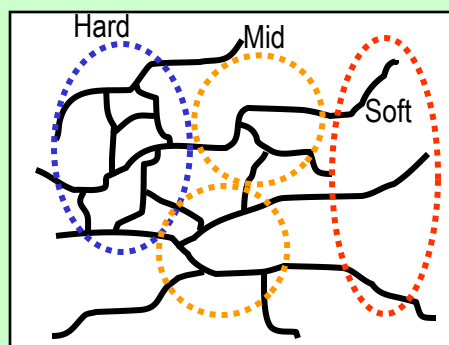
No matter what shape the measurement sample may have or no matter what inorganic matter the measurement same may contain, the measurement can be made in a short time, using a small amount.

Analysis of the degree of hardening of resin by use of pulse NMR (image figures)

Approximate analysis of 3 components by use of pulse NMR and the molecular mobility of the polymer chains



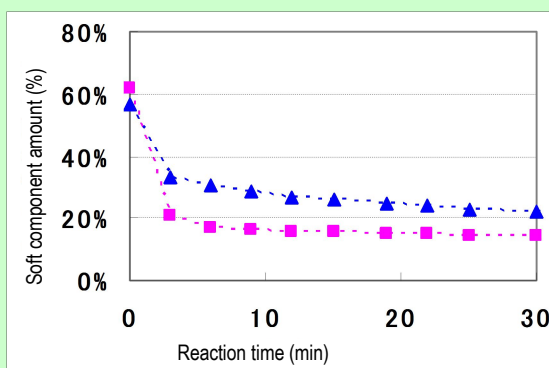
Schematic diagram of crosslinked polymer



Hard component: In state in which there is little or no molecular mobility due to crosslinking
 Mid component: In state in which molecular mobility is restricted due to crosslinking
 Soft component: In state in which crosslinking has little effect and the molecular chains can move

Example of practice: Comparison of the hardening degree of epoxy resin that differs according to the difference in hardening conditions

Change with time in reaction process (amount of uncured components)



Hardened state after 30-min hardening reaction
 Condition A (▲) Condition B (■)

Hard	28%	46%
Mid	50%	40%
Soft	22%	14%

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