Dendrimers:

This work, done in conjunction with George Newkome, began in the late 1990s. Interest is still lingering due to possible applications of the analysis undertaken in our rotaxane work. We analyzed three generations of ter-butyl and methyl ester, amide based dendrimers via DEA (46). Secondary relaxations, conforming to Arrhenius behavior increased in temperature with generation number. The glass transiton behavior of the dendrimers exhibited WLF behavior. The WLF constants C_1 and C_2 allowed the determination of free volume and expansion coefficients. When the first generation tert-butyl dendrimer was used to produce PMMA/ dendrimer blends, dielectric analysis clearly evidenced the solubility limit of the dendrimer (47). Dielectric data for the phase separated dendrimer relaxation, α_D, exhibit WLF behavior in the blend (fig 13). The WLF constants and glass transition temperatures determined via curve fitting matched those of the neat dendrimer.

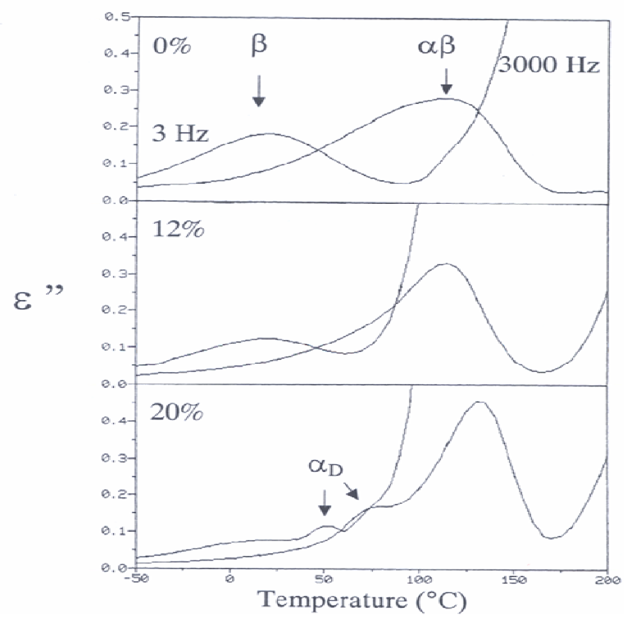

Figure 13

This data encourages us to examine molecular motion on metal organic structures blended with, or synthesized via *in situ* polymerization. To date, none of our rotaxane structures evidenced separate relaxations in blends. We have began examining metal organics embedded in dielectrically inactive polymers to probe molecular motion within the metal organics. Earlier work reported the use of polyethylene as a binder to examine dendrimers and ground electrically active polymers (31, 48).

References

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