Dialkyl adipates are a class of ester materials used as components of lubricants and plasticizers. Diffusion of plasticizers in polymers is a complex process that is difficult to study\(^1\). As a contribution to understand this phenomenon, the self-diffusion coefficients of five dialkyl adipates (dimethyl, diethyl, dipropyl, dibutyl and bis(2-ethylhexyl)) were measured by the PFGSTE method in the temperature range 20 to 70°C. Simultaneous measurements of densities and viscosities of the adipates allows calculation of several types of molecular radius that provide an interpretation in terms of shape and degree of molecular association. Neat samples of pure adipates were measured in sealed capillars placed inside of 3mm NMR tubes with a D2O 99.9% bath to provide both for lock and temperature equilibration. The diffusivities were measured with a 3mm BBO probe at 500MHz using the BPPLED bipolar pulse sequence and \(D_{\text{max}}\) 56G/cm.

**REFERENCES**


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**CONCLUSIONS**

- Diffusivities of adipates decrease almost linear with the number of carbons of the alkyl chain. Conformational effects are very subtle.
- Like in linear polymers density decreases with MW while viscosity increases.
- In liquid adipates the molecules can pack much better then spheres avoiding void volumes.
- The branched adipate DEHA is more sphere like probably due to the conformation mobility of its alkyl chains.

**REFERENCES**