

Dielectric analysis of light-curing dental restorative materials—a pilot study

M. Rosentritt¹ ✉, **M. Behr¹**, **S. Knappe²** and **G. Handel¹**

(1) Department of Prosthetic Dentistry, University Clinics, Regensburg, Germany

(2) Netzsch-Gerätebau, Selb, Germany

Received: 14 March 2005 **Accepted:** 4 August 2005 **Published online:** 21 April 2006

Abstract This study tested the potentiality of dielectric analysis (DEA) for determining the reaction performance of light-curing dental resins. The influence of polymerisation conditions and material properties on the ion viscosity were investigated within a current field. The restoratives were light-cured for 20, 40 or 60 s in a layer thickness between 1, 2, or 3 mm with a varying distance between curing light and specimen of 1, 3 or 5 mm. The tests were performed at 25°C/37°C with different polymerisation modes. Nine restoratives (two composites and their derivate flowables, two ormocers, one compomer, one nano-filled composite and one siloran) were investigated. The ion-viscosity-time graph was analysed to characterize reaction velocity and polymerisation conversion. The slope of the ion viscosity decreased with increasing distance between polymerisation light and specimen. The time of exposure affected the affinity and the conversion, with a polymerisation maximum at 40 s. A relation between thickness and reaction time and between polymerisation modus and conversion/velocity was found. The temperature influenced the reaction affinity. Different materials showed an individual curing performance. DEA-monitoring of the ion viscosity gives principal insight in the polymerisation reaction of light curing materials. Further investigations are necessary for identifying the relation between ion viscosity and polymerisation.

✉ **M. Rosentritt**

Email: martin.rosentritt@klinik.uni-regensburg.de