

## Polyimide Resin

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Polyimides are high-performance plastics. They are normally thermoplastics, but they can also be cured. Due to their very good mechanical, chemical and thermal resistance, they are used in sophisticated applications where they can replace metals or glass. They are, for example, interesting for the automobile industry because they withstand intense heat and are resistant against corrosive lubricants and petrol. For applications where polyimides have to be cured, it is important to know the temperature and time the curing process requires.

### Test Conditions:

**Temperature range:** 30 ... 300°C, isotherm

**Heating rates:** 2, 10 and 20 K/min

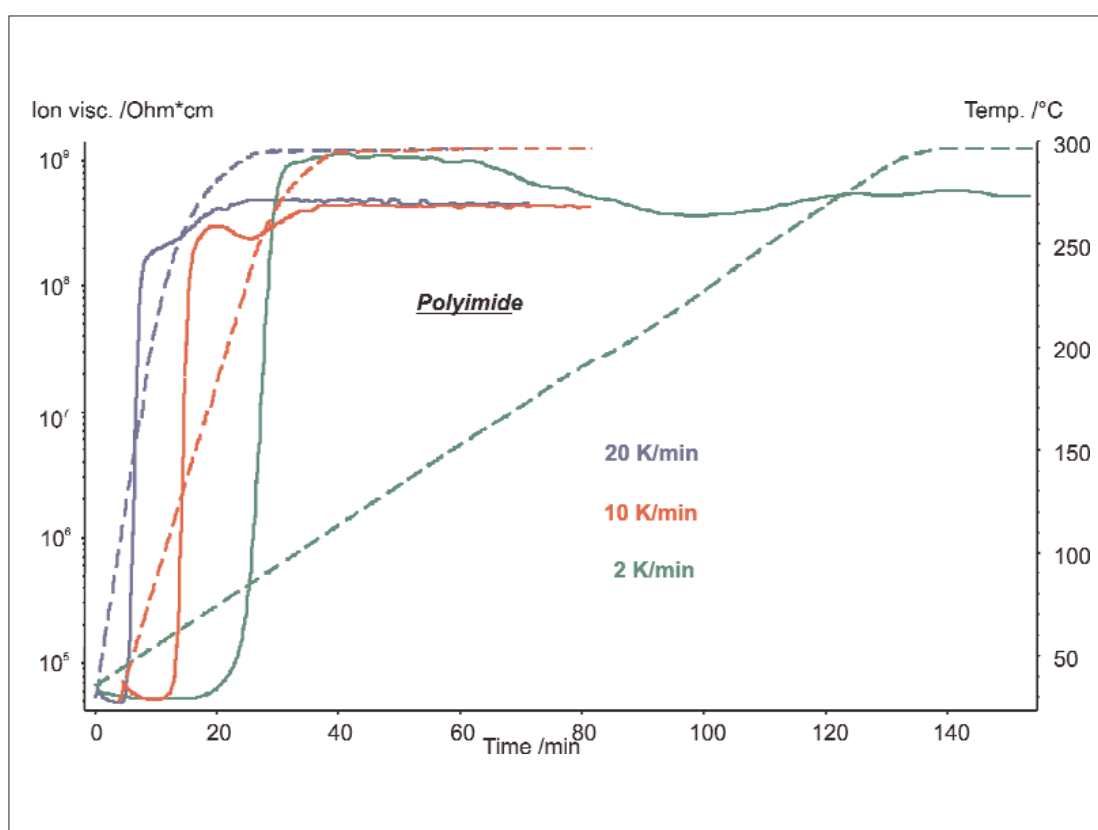
**Atmosphere:** Air (static)

**Sensor:**

IDEX (comb structure and electrode distance of 115 µm)

**Frequency:**

10 kHz



## Results:

At the beginning of the test, the ionic viscosity decreased. This effect is due to softening of the sample because of the temperature increase. Then, the ion viscosity increased - this corresponds to the beginning of curing. After a slight decrease, the ion viscosity increased again; this indicates a second step in the reaction. The ion viscosity increase between the beginning and end of curing amounts to four decades.

On the basis of these three measurements, a kinetic model was calculated with the *Thermokinetics* software. A model with three successive steps was used:  $A \rightarrow B \rightarrow C \rightarrow D$  with all steps autocatalysed.

The model fits with the measurements with a correlation coefficient of 0.999.

