

Moisture Curing of an Adhesive by TMA and Humidity Generator

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The measurement of the gelation time of a thermoset during curing is one of the standard applications of TMA [1]. The gelation time or pot life is the time that the molecules in a resin take to form a gel. After gelation, the resin is no longer suitable for its intended use. The gelation time determines the timeframe in which the resin undergoing curing can be processed. Curing reactions can be initiated by the input of heat, light or moisture. Investigation of the latter means that experiments must be carried out under conditions of controlled humidity. Moisture-curing resins can be investigated by coupling a TMA/SDTA 2+ to a humidity generator. The sample is exposed isothermally to a defined relative humidity (RH) and the sample measured using the DLTMA technique[1].

In this application, we show how the moisture curing of an adhesive can be investigated by DLTMA-Sorption using polyurethane (PUR) as an example [2]. Figure 1 shows the instrument setup and Figure 2 the measurement curves received by TMA.

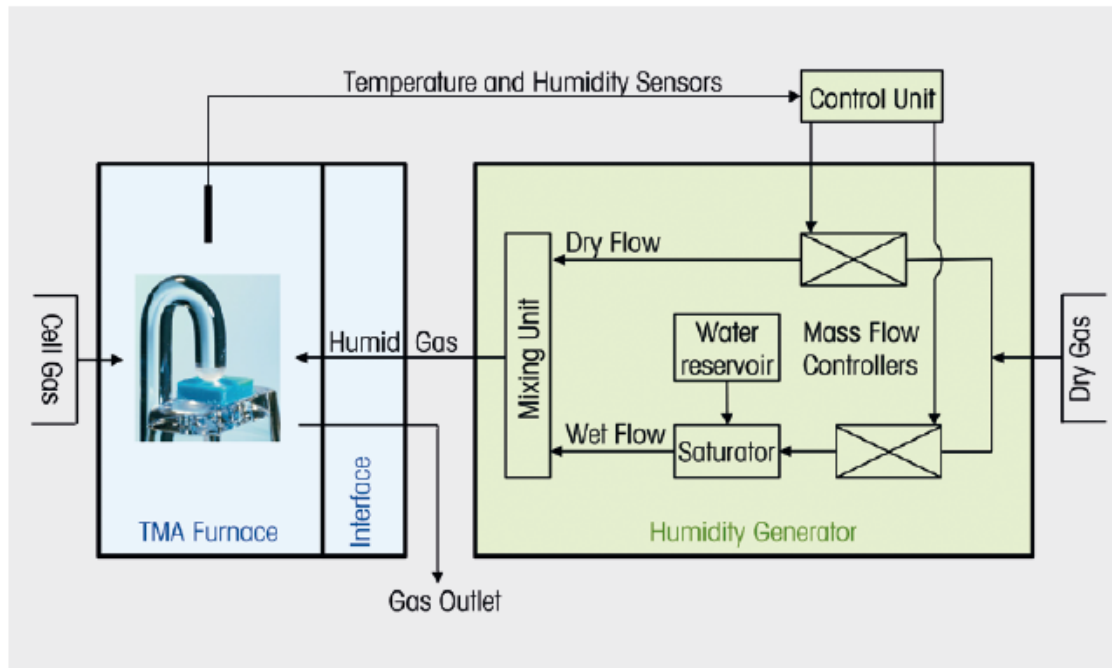


Figure 1: Setup of a system for sorption experiments using TMA.

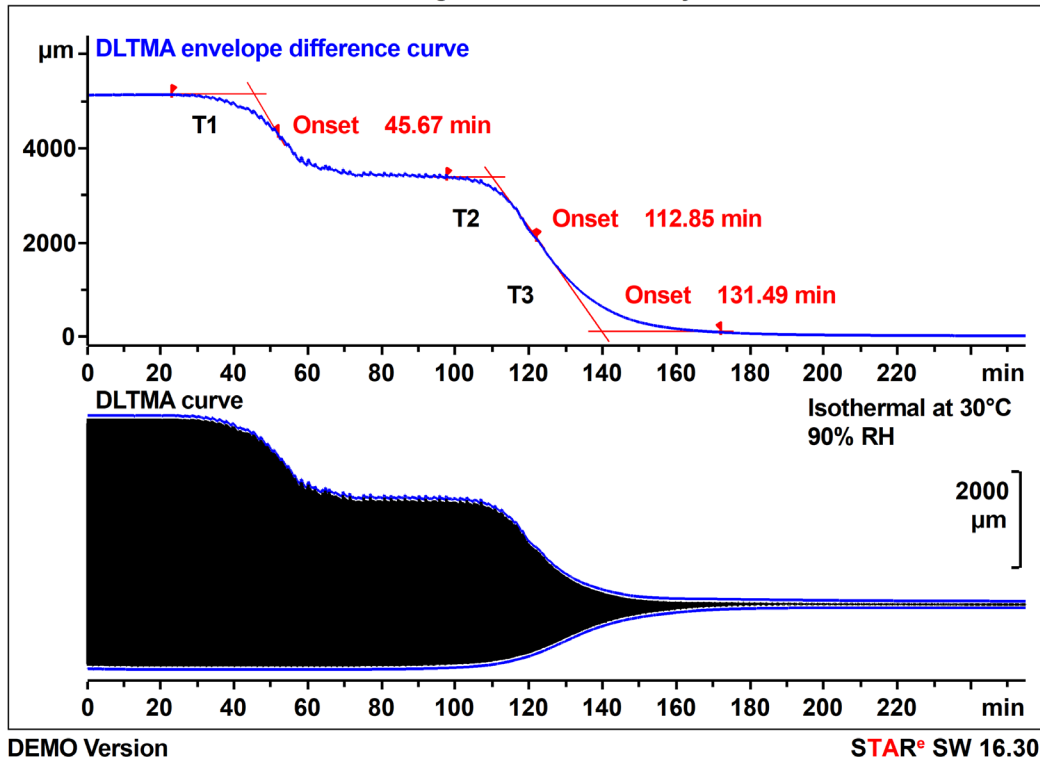


Figure 2: Moisture curing of a polyurethane adhesive at 30 °C and a relative humidity of 90%.

[1] Determination of the gelation time by DLTMA. Thermal Analysis Application No. HB 23. Application published in METTLER TOLEDO TA Application Handbook Thermosets Volume 1.

[2] Mettler Toledo UserCom 54, Moisture curing of an adhesive using the TMA/SDTA 2+, Andreas Bach