



Tech Bulletin

Cure Testing of DT-6060 at Ambient Temperature vs. High Temperature

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The curing behavior of DT-6060 has been tested by Fourier transform Infrared (FTIR) spectroscopy, thermogravimetric analysis (TGA), and contact angle measurements on surfaces. The DT-6060 coatings and coating compositions are covered under U.S. 9,567,488 issued February 14, 2017, and counterpart foreign patents. Methods for forming coatings with DT 6060 are the subject of pending U.S. Patent Application No. 2017/010740 filed December 30, 2016, and published April 20, 2017.

DT-6060 forms the same coating under ambient and thermal curing conditions. This enables its versatile application and the possibility of tailored coating procedures for multiple applications. DT-6060 was studied on aluminum surfaces, Q-panels (steel) and polymer surfaces. The coating progress proceeds well on these substrates. Water is formed as a reaction product, indicating oxygen-mediated crosslinking reactions, which lead to chemically resistant surfaces.

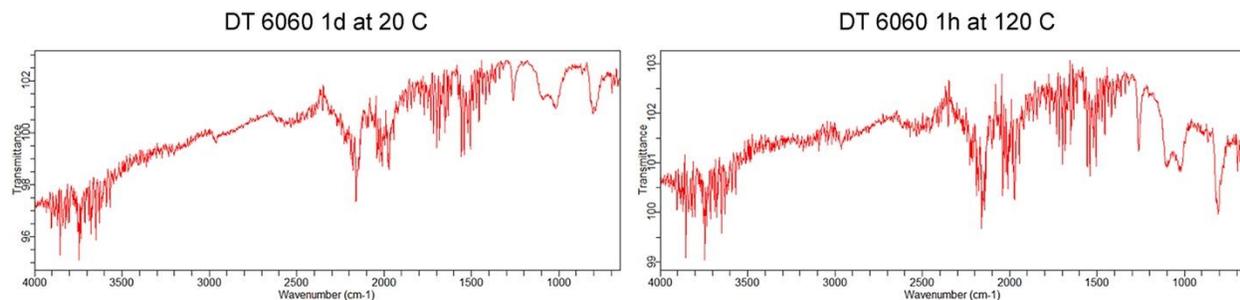


Figure 1: FTIR spectra of DT-6060 on aluminum. Left: 24 h at 20 °C/70 °F, at a film thickness of 2 microns. Right: thermal curing for 1 h at 120 °C/250 °F at a film thickness of 2 microns. The DT-6060 cure cycle is quantified by its progress of reaction using thermogravimetric analysis (TGA).

DT-6060 on quartz was heated from 20 °C to 100 °C (reached after 4000 s (66 min)), and then maintained at 100 °C/212 °F. The initial weight loss (93%) is due to the evaporation of the solvent mixture in DT-6060.

The remaining weight of the DT-6060 layer of 7% original mass remained constant during 12-hour incubation at 100 °C. This indicates that DT 6060 layers are formed once the solvent has evaporated, and no further loss of either solvent or low-molecular weight silanes is observed.

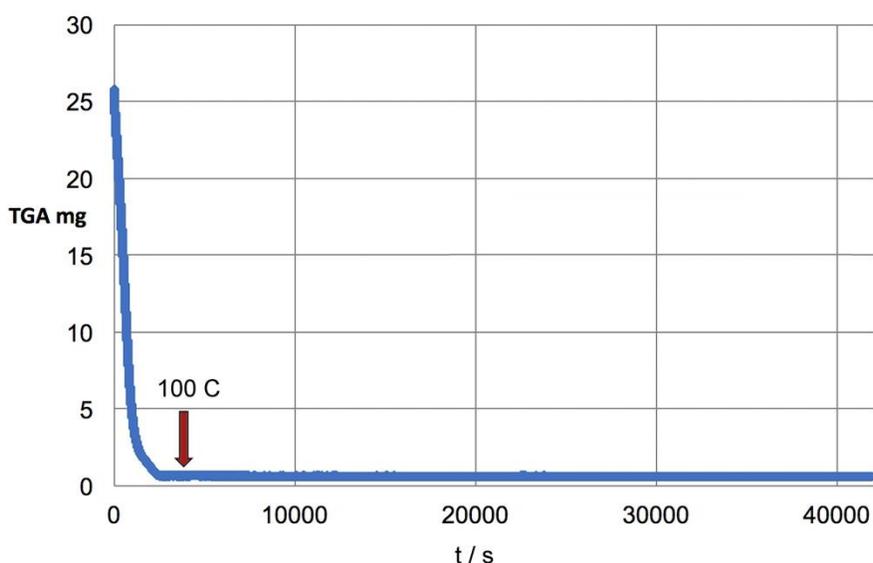


Figure 2: Thermogravimetry of DT-6060 on quartz. The red arrow indicates when 100 °C / 212 °F was reached. This temperature was maintained for 12 h. The initial weight loss is attributed to solvent evaporation during the linear heating phase from 20 °C to 100 °C during the first 4000 s (66 min.)

Coating and Re-Coating of DT- 6060

The DT-6060 formulation also hydrophobic, showing a surface angle of 125 ± 5 degrees. Therefore, the DT-6060 formulation spreads well on all hydrophobic surfaces, coatings and itself. This feature enables the repair of DT-6060 coating by simply adding another coating of DT-6060 on top of the material. There is no need to remove the first coating before re-applying DT-6060.