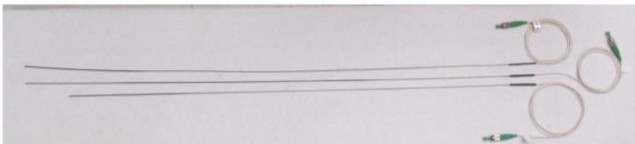
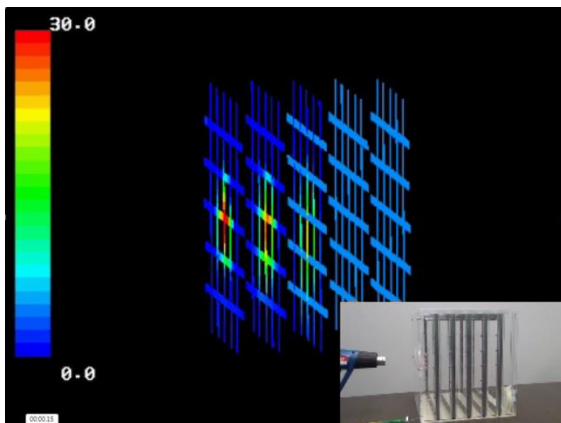


Overview

Temperature uniformity within the furnaces used for heat treatment plays a key role in the quality of the resulting material structure. Few process furnaces are as uniform as one would expect. This temperature non-uniformity can lead to a reduction in part strength and quality.



Temperature probes used for single-scan profiling of a small box furnace



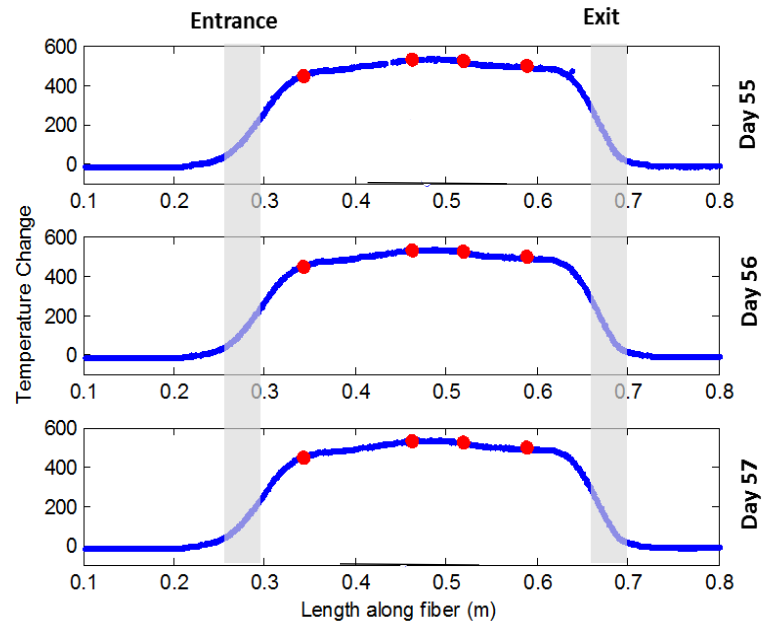
3D mesh of fiber sensors can be constructed to give a full thermal profile

Problem

- Multiple heating element furnaces can have cooler zones between the elements
- Typical profiling is accomplished by pulling a thermocouple through the furnace
- This is time consuming and can be inaccurate if the furnace changes over the time of the profile

Solution

- A high definition fiber optic probe and Luna ODiSI system can capture the profile of a furnace in a single scan taking less than a second
- The resulting high resolution map of the furnace temperature highlights potential problem areas, like gradients, which may affect processing
- Element power can be adjusted in real time to improve the uniformity of the hot zone to maximize system performance and efficiency



Blue curve – ODiSI Thermal measurement of profile within oven shown on the left, Red points - RTDs