

A new generation of ultralight thermochromic indicators based on temperature induced gas release

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Supporting information

Relative Au4f/C1s concentrations as determined from XPS spectroscopy

Sample name	Au4f/C1s (At%/At%)
A_RT	0.47
A_10min	0.46
A_20min	0.44
A_40min	0.38
A_1min	0.11
A_2min	0.22
A_3min	0.30
A_4min	0.53
PVP_RT	0.54

Table S1. Relative Au4f/C1s concentrations as determined from XPS spectroscopy for the samples sputtered with equal amounts of gold and heated for different heating times (A_RT through A_40_75) and the samples sputtered with varying amounts of gold, ranging from cca 1 to 4 nm, after heating at 75C for 40 min (A_1min through A_4min)

The difference in the relative concentrations between sample A_40min and A_3min can be explained by slight differences in the sputtering rates between two consecutive processing rounds.

Influence of the heating temperature

The half-life of radical initiators varies with temperature according to an exponential law. For AIBA the corresponding equation was determined to be:

$$\log(t_{1/2}) = 6426(1/T) - 16.75 \quad (1)$$

where t is the time in minutes and T is the temperature in K

It is thus expected that the response time of our optical indicators will be much faster at higher temperatures. Two gold-sputtered non-wovens were treated for 10 minutes at 85°C and 95°C respectively. The corresponding half-lives of the initiator at these temperatures are 15 minutes and 5 minutes respectively. No changes at macroscopic level in the color shade of the surface were detected on the sample treated at 85°C; however the appearance of a pink hue was observed upon exposure for an equal amount at 95°C (**Figure 1s**). The microscopic analysis of the nanofibers morphology confirmed the fracturing of the gold layer in a much shorter time, as a consequence of the rapid generation of the nitrogen gas occurring at higher temperatures.

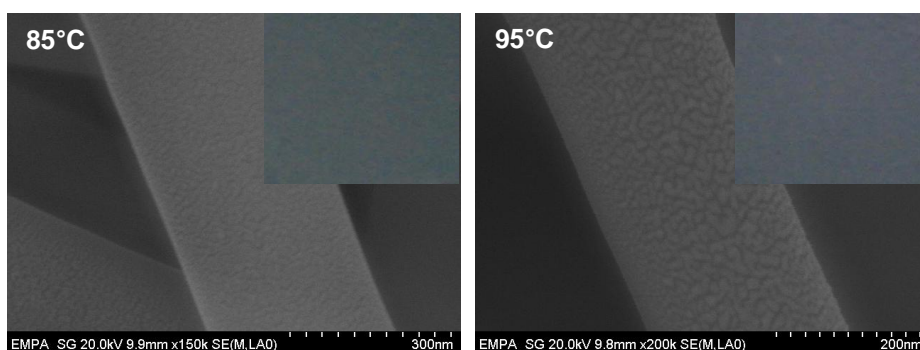


Figure S1. SEM micrographs of nanofibers heated at 85°C for 10 minutes and 95°C for 10 minutes. The inserts are photographs showing the macroscopic colors obtained after these heating times.