

## Supporting Information

### Template based Formation of Microbubble Contrast Agent

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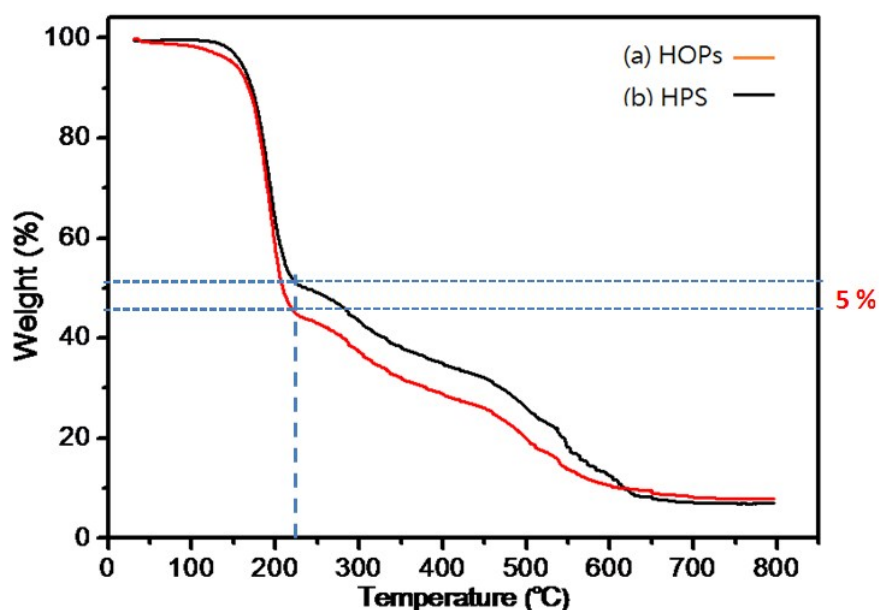
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#### 1. TGA results from HOPs and HPS

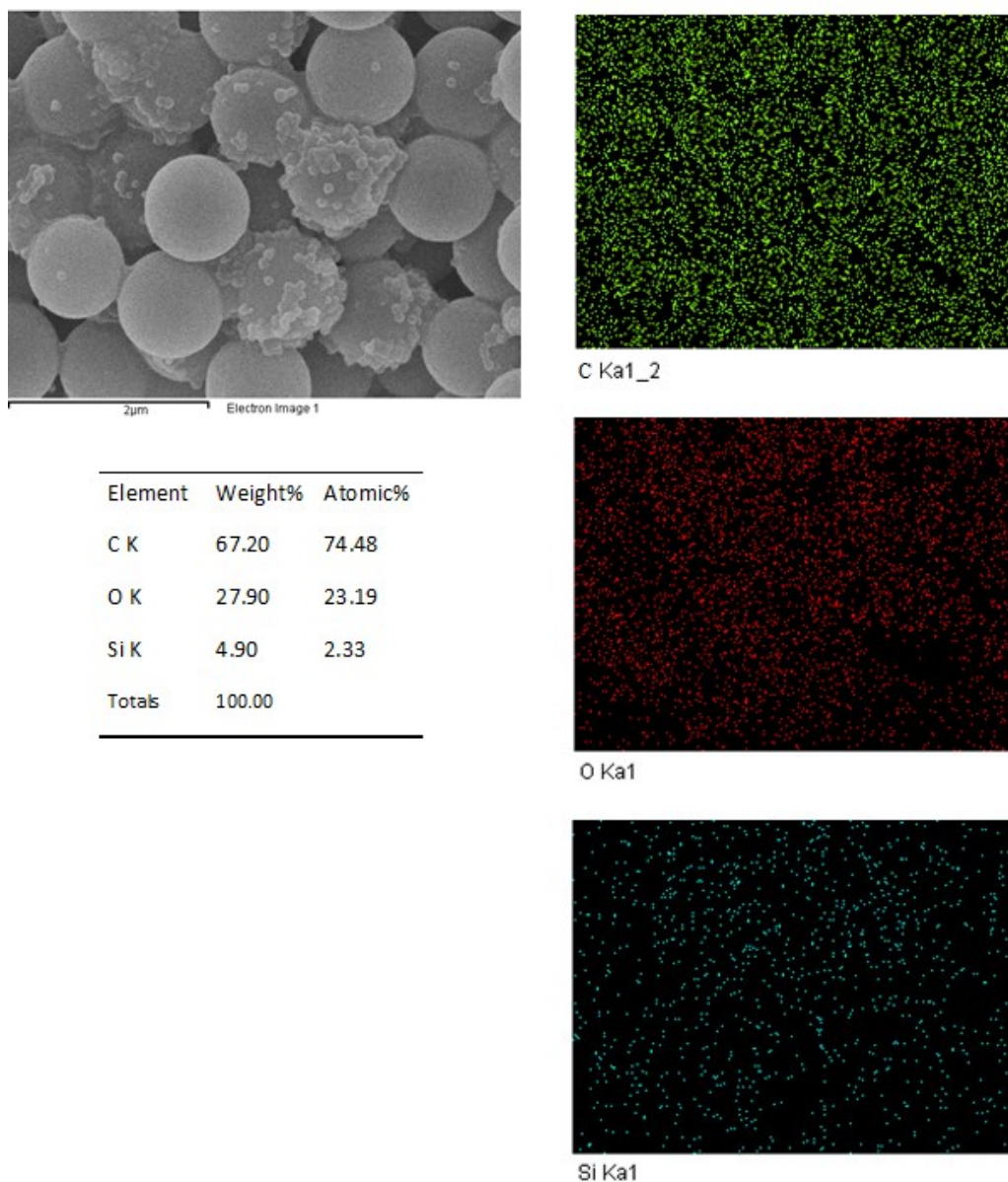
The PEGylation step was done by EDC, which activate carboxylates of HOPs first and then conjugate with the amine group of mPEG-NH<sub>2</sub>. In order to estimate the amount of PEGylation, TGA results good evidence as shown in Fig S1. The HOPs and HPS is the microsphere before and after the PEGylation, respectively. As shown in Fig. S1, HOPs (curve a) displayed more mass-loss profile above 220 °C compared to the HPS (curve b). This additional component contributed from PEGylation of HOPs. From this result, we estimated the amount of PEGs attached to template was about 5 %.



**Fig. S1. TGA curves of (a) HOPs and (b) HPS.**

2. SEM-EDX spectra of HPS

The HPS surface remained intact after covering with PEG, revealing a good structural stability as shown as Fig. S2. A trace amount of silica can maintain the HPS structure stability. Indeed, we can observe the HPS contains about 4.9 % Si in Fig. S2.



**Fig. S2 SEM-EDX image of HPS**