Side Chain Thiol-functionalized Poly(ethylene glycol) by Post-polymerization Modification of Hydroxyl Groups: Synthesis, Crosslinking and Inkjet Printing

Supporting Information

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1. Derivation of Equations 1 and 2

For deriving equation 1, the intensity of one proton in the $^1$H NMR spectra of the tosylation polymers is assumed to equal the intensity $\text{Int(Ts)}$ of the tosylation related signal intensities (signals a’, c’, d’ and e’ in Figure 1) divided by 9.

Each repeating unit with a tosylation group has 3 backbone protons. The signal intensity $\text{Int(EO)}$ corresponding only to EO repeating units can then be expressed as (with the intensity $\text{Int(BB)}$ of the total polymer backbone signals, signal b’ in Figure 1):

$$\text{Int(EO)} = \text{Int(BB)} - 3 \cdot \frac{\text{Int(Ts)}}{9}$$

For each repeating unit carrying a tosylation group, the number $n(EO)$ of EO repeating units can be expressed as:

$$n(EO) = \frac{\text{Int(EO)}}{4 \cdot \frac{\text{Int(Ts)}}{9}}$$

The percentage $p\%_{Ts}$ of repeating units carrying a tosylation group can then be calculated as:

$$p\%_{Ts} = \frac{1}{n(EO)+1}$$

Rearranging yields equation 1.

Equation 2 can be derived in a similar manner assuming that each side chain with a triphenylmethyl group has 17 protons (signals a’’, c’’ and d’’ in Figure 1).