**555b Reaction Engineering Aspects of a Tissue Adherent Hydrogel**

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There exists a medical need for hydrogels that can be sprayed onto tissue during surgery for use as sealants, drug delivery vehicles, and surgical adhesion preventatives. Several properties must be balanced in order for the hydrogel to gel in place and for it to perform successfully. The reaction fluids must be inviscid enough for them to be sprayed by a hand-powered device. The gel must form in a matter of seconds and adhere tenaciously to the tissue. Furthermore, the gel must remain in place long enough to have the intended therapeutic effect and the reactants and breakdown products must not be toxic to tissues. In the system that we will present, polymerization reactions occur in hydrophobic microdomains and govern the ultimate deliverability and utility of the hydrogel.

It has been previously shown that polymerization of polyethylene glycol (PEG)-poly(D,L-lactide) ABA block copolymers end-capped with acrylate groups can be photoinitiated to form biodegradable hydrogels [1], and drug delivery matrices.[2] Here we present advancements in gelation chemistry that do not require illumination. We will provide data showing that polymer concentration, molecular weight, and initiator concentrations affect sprayability, gelation time, and mechanical properties.

1. Lyman ML and Sawhney AS. Design of a Synthetic Pneumosealant, Abstract #212. Proceedings of the 5th World Biomaterials Congress, Toronto, CA, May 29-June 2, 1996.

2. Hill-West JL, Dunn RC, Hubbell, JA. Local release of fibrinolytic agents for adhesion prevention. J. Surg. Res. 1995, Dec; 59 (6): 759-63.