Ibuprofen-functionalized poly(β-amino ester)-based crosslinkers for controlled delivery from hydrogels

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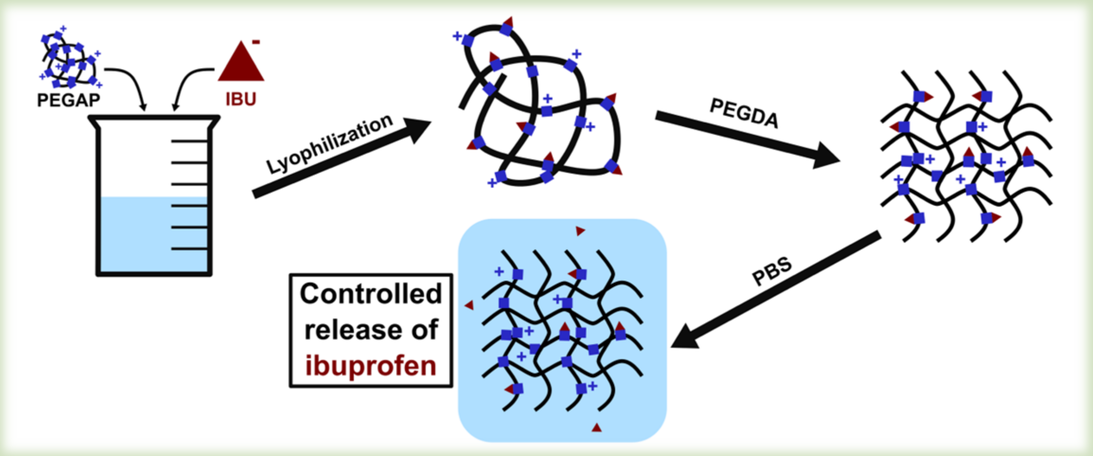
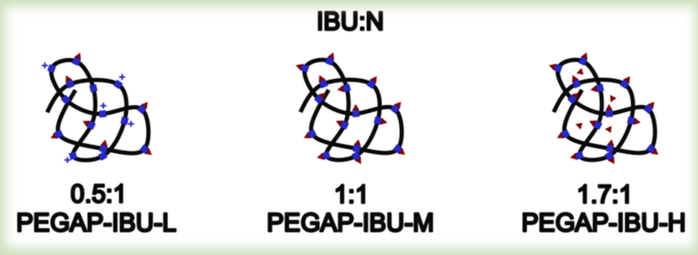
ABSTRACT

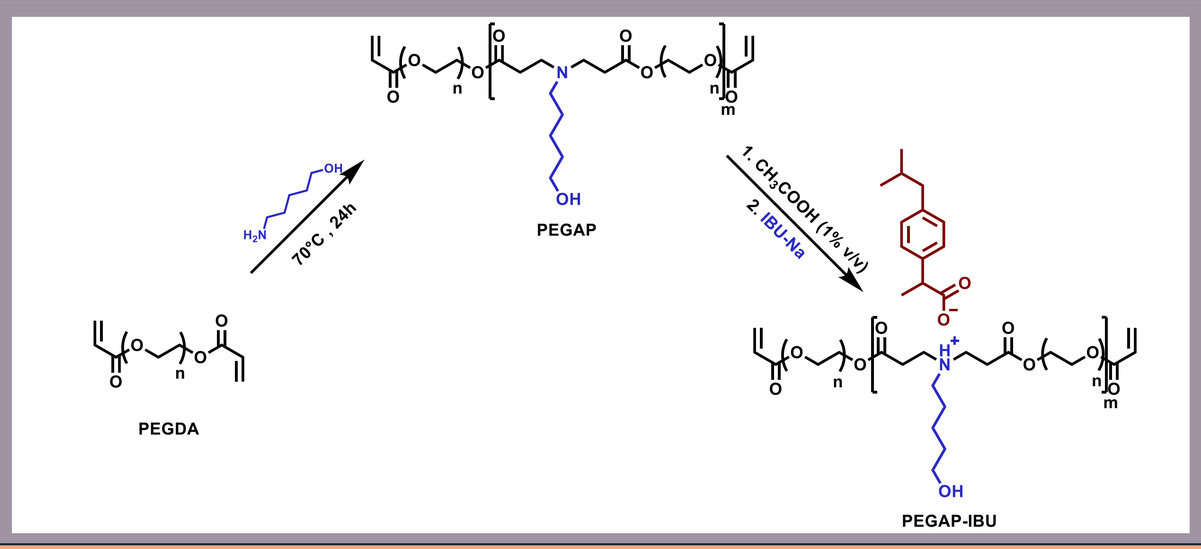
Ibuprofen (IBU), a popular non-steroidal anti-inflammatory drug (NSAID), has low solubility in water and low bioavailability, thus requiring frequent administration. However, long-term use of IBU may have some serious side effects like hepatitis and strokes, so it is desirable to design controlled release systems and/or more bioavailable forms for the drug. To control the IBU release and target certain tissues, a poly(β-amino ester) (PβAE) network is proposed. A PβAE crosslinker macromer (PEGAP) is synthesized and functionalized with IBU to yield PEGAP-IBU. This crosslinker is used to form co-polymeric hydrogels of PEGDA, and their release profiles and degradation mechanisms were investigated.

AIM OF THE STUDY



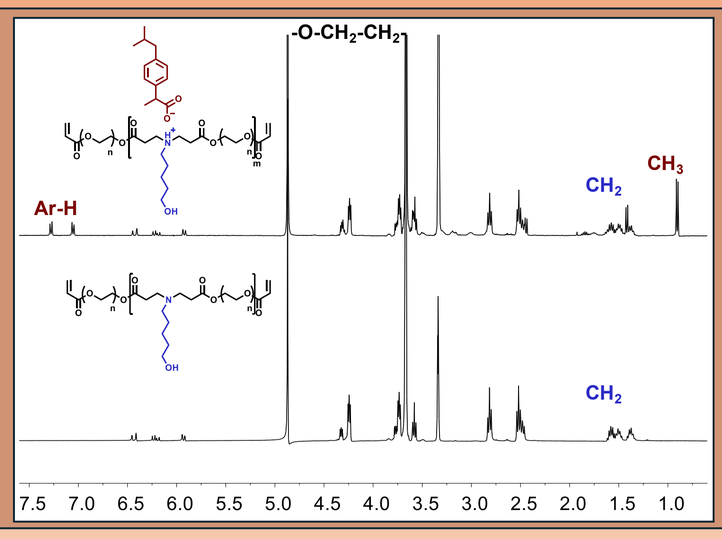


SYNTHESIS OF PEGAP-IBU

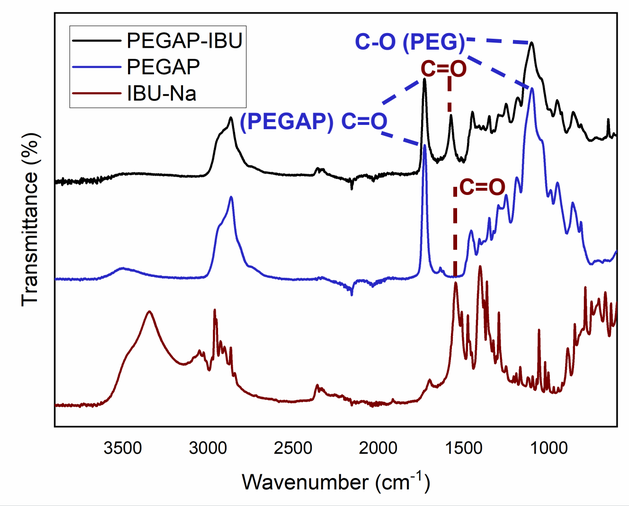


CHARACTERIZATION

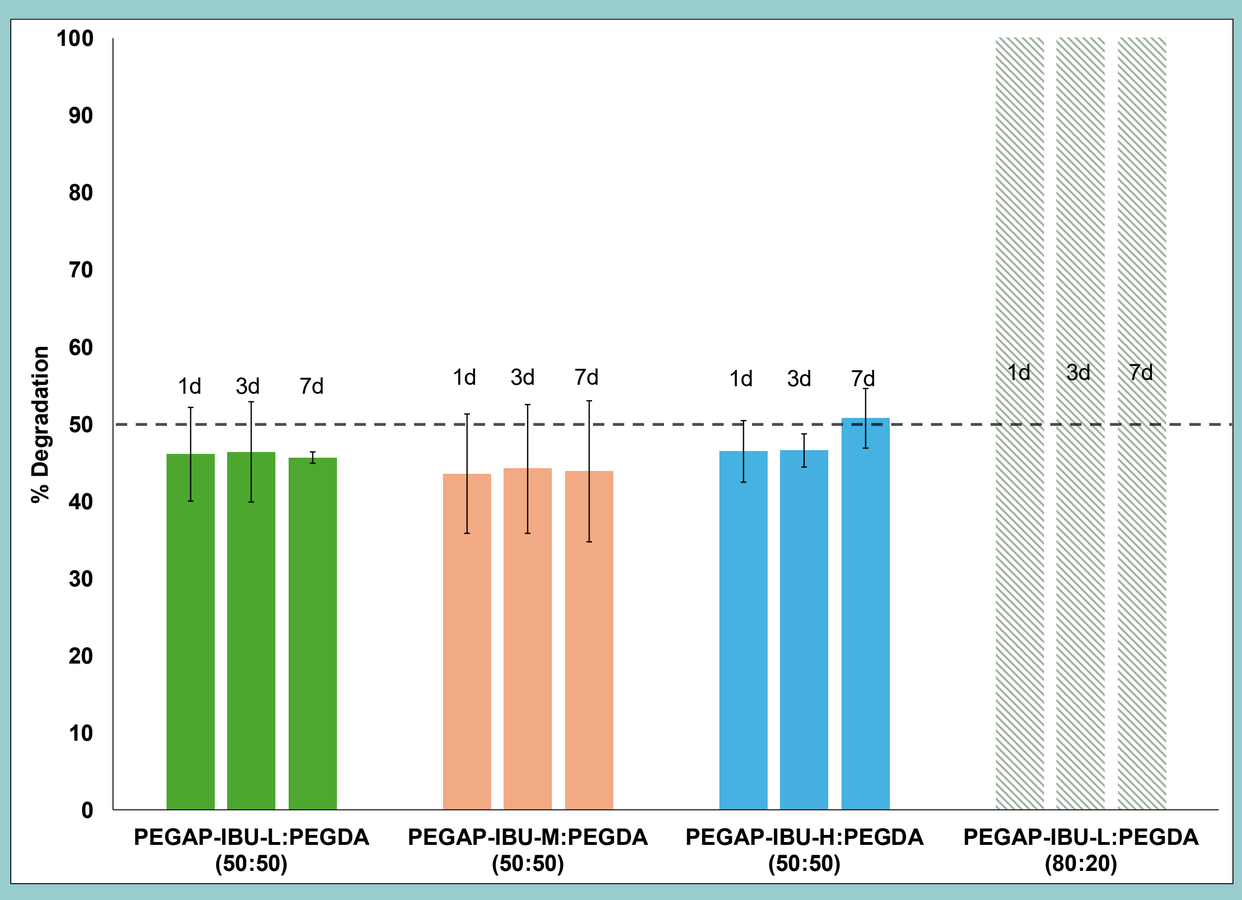
^{1}H NMR



FTIR

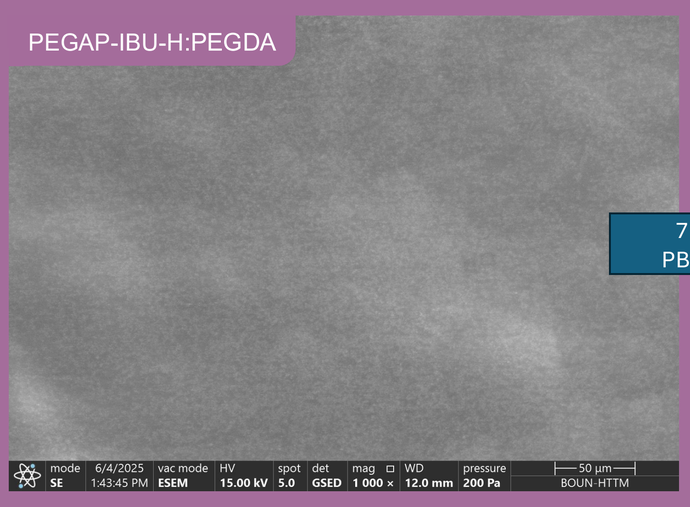


DEGRADATION RESULTS

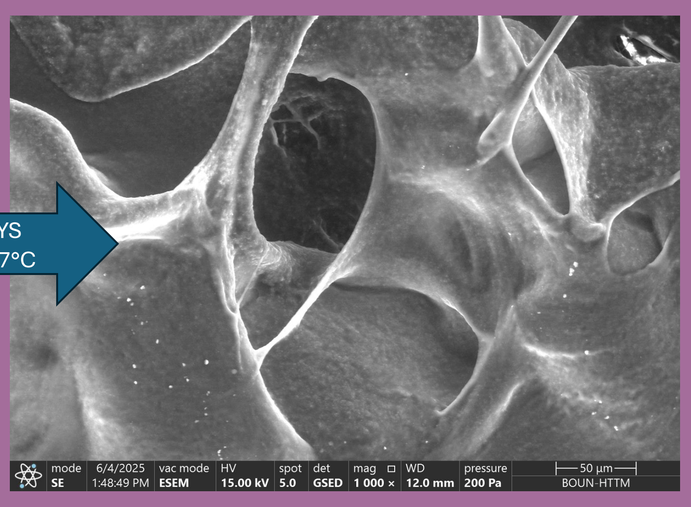


DEGRADATION OF HYDROGELS

BEFORE

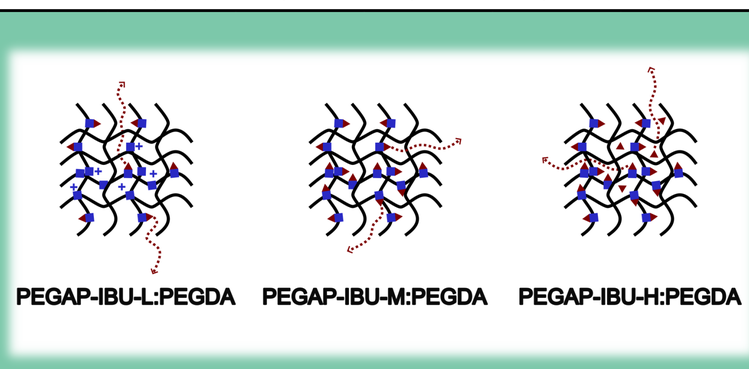


AFTER

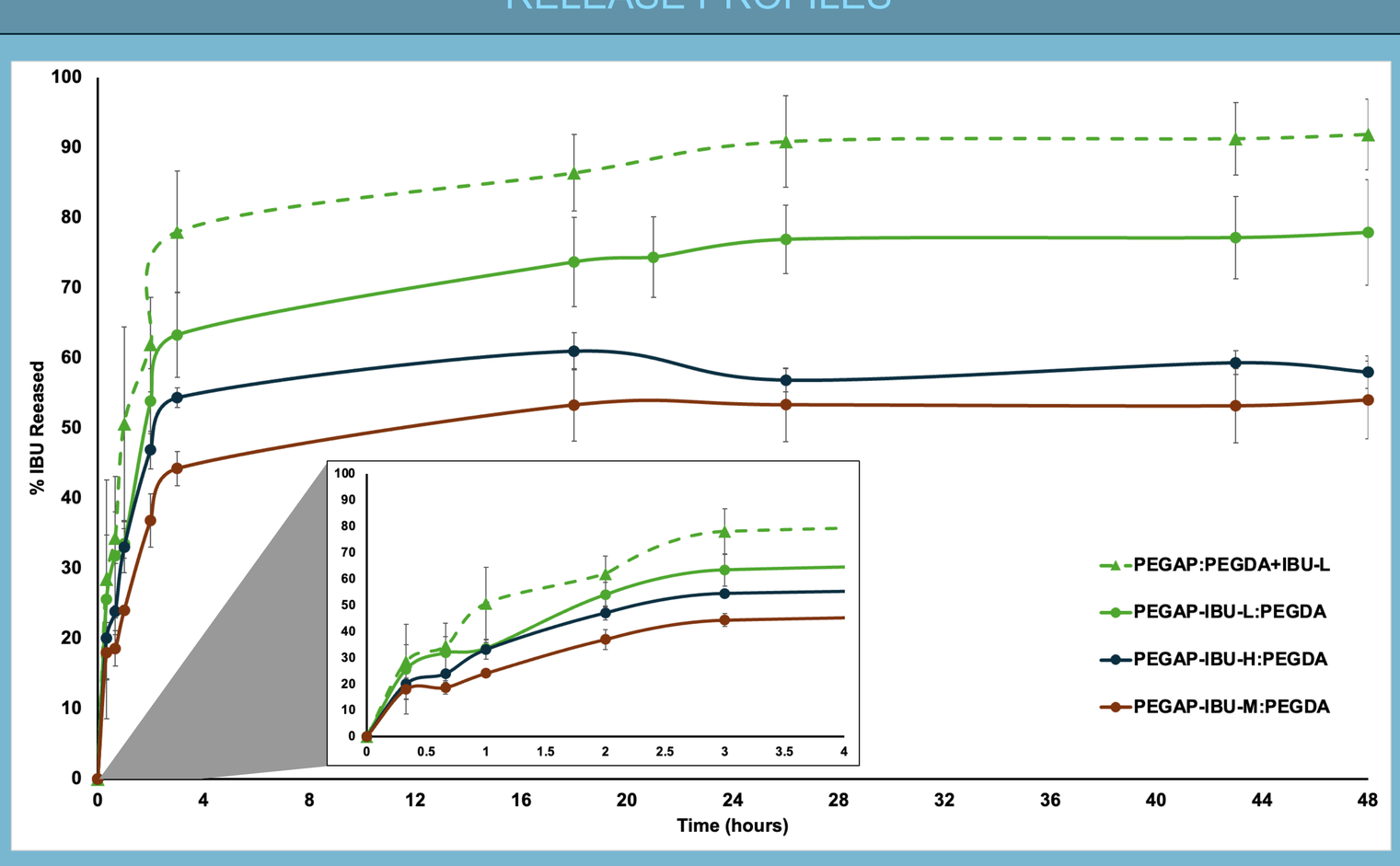


RELEASE KINETICS

PEGAP-IBU-X:PEGDA	Korsmeyer–Peppas		Peppas–Sahlin			
	n	R^2	k_1	k_2	m	R^2
Low	0.4249	0.9560	0.2484	0.1296	0.3383	0.9870
Medium	0.4455	0.9274	0.3083	-0.0416	0.4848	0.9808
High	0,4805	0,9775	0,3758	-0,0476	0,5964	0,9959



RELEASE PROFILES



CONCLUSION

- ✓PβAE systems with ibuprofen delivery property are successfully synthesized and their hydrogels prepared
- ✓The systems release rate is controlled by the load of ibuprofen
- ✓The hydrogels show high degradability
- ✓This material is a promising candidate for novel drug delivery systems

ACKNOWLEDGEMENT

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