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Underwater Reversible Adhesion Between Oppositely Charged Weak Polyelectrolytes LATIFAH ALFHAIID, MARK GEOGHEGAN, NICHOLAS WILLIAMS, WILLIAM SEDDON, University of Sheffield — Force-distance data has shown that the adhesion between two oppositely charged polyelectrolytes: poly(methacrylic acid) (PMAA, a polyacid) and poly[2-(diethylamino)ethyl methacrylate] (PDEAEMA, a polybase), was controllable by varying the pH level of their surrounding. Accordingly, adhesive force at the interface between these two polymers was higher inside basic surroundings at pH 6 and 7, and then it started to decrease at pH level below 3 and above 8. Stimulating adhesion between PMAA gel and PDEAEMA brushes by adding salt to their surrounded water has only a limited effect on the adhesive force between them, contradicting previous results. Increasing the molar concentration of sodium chloride (NaCl) in the surrounded water of these two polymers from 0.1 to 1M did not decrease the adhesion forces between a PMAA gel and a grafted PDEAEMA layer (brush). The JKR equation was used to evaluate the adhesion forces between the polymer gel and the brushes and it was observed that the adhesion increased with the elastic modulus of the gel decreased.

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