

# Direct Peptide Synthesis on a Silicon Surface

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## **Abstract**

This work introduces the use of solid phase peptide synthesis on a silicon substrate as a means of directly forming a peptide layer on a surface. We have synthesised a 15 residue peptide from the surface of an aminosilanized silicon wafer; the peptide contains a zwitterionic sequence of alternating lysine and glutamic acid residues. We confirmed the presence of the peptide layer on the surface by X-ray photoelectron spectroscopy (XPS) and ellipsometry. Atomic force microscopy (AFM) was then used to study the forces between the peptide-modified surface and a borosilicate glass sphere, and pH dependent behaviour consistent with the presence of the peptide was observed. Immobilisation of peptides at interfaces has previously been achieved by either physisorption or a “grafting to” approach. The “grafting from” method detailed in this work will allow the formation of peptide brushes and layers with much higher density than was previously possible, while also minimising the expense associated with the commercial purchase of peptides. Layers formed by this technique may be used instead of conventional polymer brushes to make use of the fine sequence control and range of functionalities available in peptides; the method also allows easy biofunctionalization of a surface for nanotechnology and biomedical applications.