

## Boronic Acids for the Generation of Responsive Hydrogels

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Several approaches currently exist for continuous monitoring of saccharides, however, to this point most sensors have involved the use of electrochemical approaches based on enzymes, such as glucose oxidase.[1] It is widely accepted that a method of continuous monitoring of glucose would prove highly beneficial for diabetes sufferers. The use of boronic acids to bind saccharides has been investigated for many years as a facile means to monitor the concentration of saccharides in solution [2]. Successful means of translating such optimised responses to complex polymeric matrices have proved significantly more difficult. Such a feat would prove invaluable for diagnostic and self-regulating systems.

Herein we present a family of novel boronic acid derivatives, using an easily-adaptable synthesis. We demonstrate a suite of applications, encompassing self-assembling gels and cross-linked hydrogels, which can bind saccharides and modulate a range of chosen responses. This binding has been probed using a series of different techniques, including optical and impedance spectroscopy. This effect can be exploited within a miniaturised device and monitored using a low-cost photodetector.

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2. Nishiyabu, R.; Kubo, Y.; James, T.D.; Fossey, J.S. Boronic acid building blocks: Tools for sensing and separation. *Chemical Communications* **2011**, *47*, 1106-1123.

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