

## **SPR sensor system for lectin-recognition using molecular imprinting hydrogel with carbohydrate ligands**

**Rinyarat Naraprawatphong<sup>1</sup>, Nagahiro Saito<sup>1,2,3</sup>, Akifumi Kawamura<sup>4</sup>, and Takashi Miyata<sup>4,\*</sup>**

**E-mail: hiro@sp.material.nagoya-u.ac.jp**

<sup>1</sup> Department of Chemical Systems Engineering, Graduate School of Engineering, Nagoya University,  
Furo-cho, Chikusa-ku, Nagoya 464-8603, Japan

<sup>2</sup> Japan Science and Technology Corporation (JST), Open Innovation Platform with Enterprises, Research  
Institute and Academia (OPERA), Furo-cho, Chikusa-ku, Nagoya 464-8603, Japan

<sup>3</sup> Japan Science and Technology Corporation (JST), Strategic International Collaborative Research Program  
(SICORP), Furo-cho, Chikusa-ku, Nagoya 464-8603, Japan

<sup>4</sup> Department of Chemistry and Materials Engineering, Kansai University,  
Suita, Osaka 564-8680, Japan

Surface plasmon resonance (SPR) is one kind of optical biosensors which can detect changes in the reflective index according to the biomolecular interaction between a target molecule and ligands molecule that attached on the chip surface resulting in an increase of SPR signals. Molecularly imprinted hydrogel layers with lectin-recognition sites were formed on SPR sensor chips via surface-initiated atom transfer radical polymerization (SI-ATRP) combined with molecular imprinting in order to develop SPR sensor systems for sensitively and selectively detecting a target protein. The lectin-imprinted hydrogel layer sensor chips showed larger SPR signal change in response to a target lectin than nonimprinted hydrogel layer sensor chips. It was attributed to the strong affinity constant of the lectin-imprinted hydrogel layer for the target lectin. These results suggest that molecular recognition sites for the lectin were formed within the hydrogel layers by molecular imprinting. On the contrary, the SPR signal change of the lectin-imprinted hydrogel layer chip in the presence of another lectin was very small. Poly(2-methacryloxyethyl phosphorylcholine) as a main chain of the hydrogel layer inhibited nonspecific adsorption of other lectin. The fascinating properties of such molecularly imprinted hydrogel layer sensor chips can provide the useful tools for construct biosensor systems with a wide variety of uses.

### References

- [1] R. Naraprawatphong, G. Kawanaka, M. Hayashi, A. Kawamura, T. Miyata, *Mol Impr.* 4, 21–30 (2016).
- [2] T. Miyata, T. Hayashi, Y. Kuriu, T. Uragami, *J Mol Recognit.*, 25, 336–343 (2012).