

Automated carbohydrate synthesizer "Golgi™"

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An automated carbohydrate-synthesizer (glycoconjugate-synthesizer) "Golgi™" was developed by mimicking biosynthetic system of the Golgi apparatus in cells. The system was improved by using tailored-magnetic beads for immobilizing glycosyltransferases and fine-filter membrane system to achieve fully-automated synthesis in 36 or 96-well reaction vessels. It was demonstrated that combined use of "Golgi™" with a conventional peptide-synthesizer gives high throughput parallel synthesis of biologically important glycopeptides.

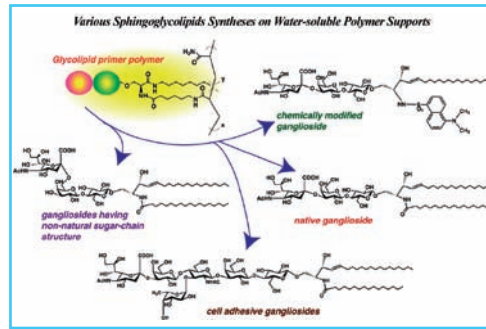


Figure 1: Application for glycolipid synthesis.

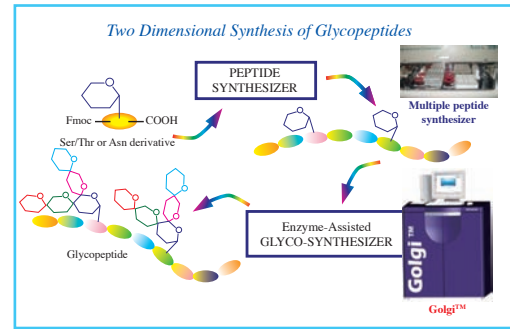


Figure 2: Strategy of the glycopeptide synthesis

Nanotechnology, Materials & Manufacturing

A novel intergrowth form of TiO₂ between rutile- and ramsdellite-type structure

Titanium dioxide with a new crystal structure was synthesized upon heating the ramsdellite-type TiO₂. The new form has an intergrowth structure between the rutile- and ramsdellite-type ones. The band gap can be controlled from 3.34 eV to 3.00 eV upon heating, accompanying a continuous structural change. As the electronic structures can be controlled by the heating temperatures, the new form of TiO₂ will be expected as candidate photofunctional materials.

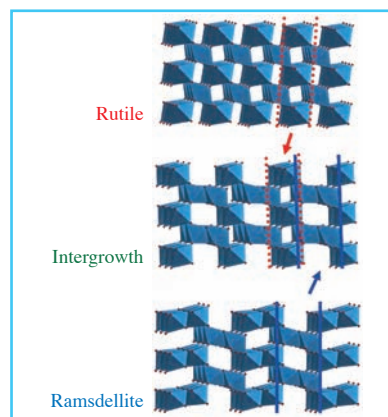


Figure 1: Crystal structures of rutile-type, the hypothetical intergrowth with ramsdellite and rutile (1 : 1) domains and ramsdellite-type TiO₂, respectively.

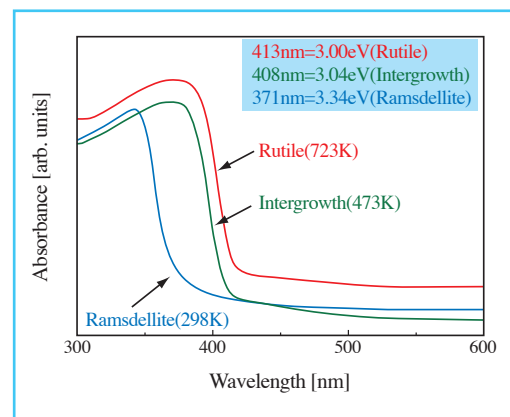


Figure 2: UV-Vis absorption spectra for as-repared ramsdellite-type TiO₂ at 298 K, after calcinations at 473 K and 723 K, respectively.

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