organic transistor-type memory, as described in the following (Fig. 2). (1) The concept of double floating-gates, bipolar charge trapping, and discrete trapping sites is first combined to develop high-performance non-volatile OFET memory. The studied double floating-gate memory could simultaneously store holes and electrons on copper phthalocyanine (CuPc) nanoparticles and needle C_{60} single crystals, respectively, leading to a broad memory window (~4.4 V), low power consumption (±5 V), long data retention time (~10^4 s), and good writing/erasing endurance (over 100 cycles). (2) A molecular nano-floating gate (NFG) consisting of pentacene-based transistor memory devices is developed using conjugated polymer nanoparticles (CPN), such as polyfluorene (PF), as the discrete trapping sites embedded in an insulating polymer, poly(methacrylic acid) (PMAA). By inserting PF nanoparticles as the floating gate, the transistor memory device reveals a controllable threshold voltage shift, indicating effective electron-trapping by the PF CPN. (3) Renewable oligosaccharides are employed as the charge storage layer in the OFET memory device because the charged hydroxyl groups facilitate the formation of strong hydrogen bonding to stabilize trapped charges and remain stable in a high-conducting state, even after successive stresses of reverse gate biases. This is the first example of employing renewable sugar-based materials as a charge storage layer that exhibit a WORM (write-once-read-many-times) memory characteristic with an ON/OFF current ratio larger than 10^6. The above results can meet the requirements for next-generation organic non-volatile transistor-type memory devices.

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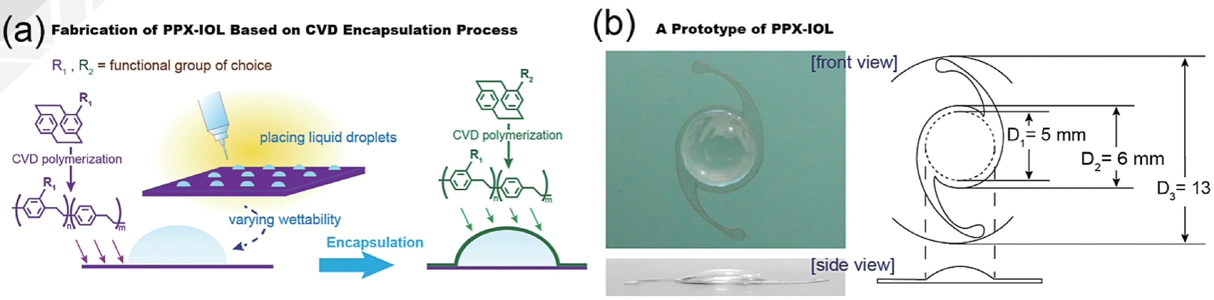
A novel intraocular lens device

The optical and biofunctional properties of anintraocular lens are customizable

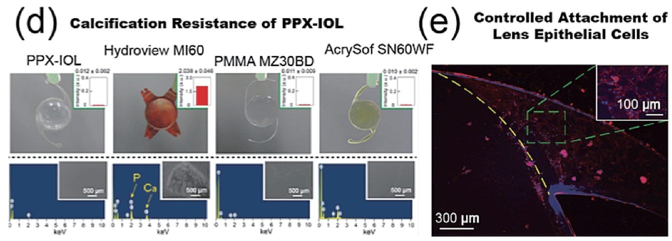
The research team of Professor Hsien-Yeh Chen (Department of Chemical Engineering) at National Taiwan University has demonstrated an innovative intraocular lens (IOL) device (PPX-IOL) that is fabricated via chemical vapor deposition (CVD) encapsulation of func-tionalized poly-p-xylylenes (PPX).

The novel design of PPX-IOL provides customiza-ble parameters for both its optical and biological proper-ties. As an excellent optical device, it provides a high re-fractive index and a tunable effective focal length that is realized by manipulating the wetting properties of liquids. The device also offers protec-tion from UV radiation. As a key medical device, it exhibits excellent biocompatibility and reduced postoperative calci-fication due to the intrinsic properties of PPX. In addition, these synergistic functions provide precise surface chemistries for the placement of eye epithelial cells via guided attachment or repel-lent properties, which is very important in preventing de-vice-associated



(c) **Tunable Optical Property**

Liquid / Treatment	Contact angle (degrees)	Refractive (-)	Effective focal length (mm)
PEG	38.11 ± 0.46	1.5688 ± 0.0006	10.695 ± 0.109
Glycerol	69.23 ± 0.30	1.5890 ± 0.0017	5.965 ± 0.144
PEG & glycerol / 1:1 mixing	44.33 ± 1.37	1.5756 ± 0.0023	7.498 ± 0.192
hydrophilic plasma treatment	20.95 ± 0.82	1.5960 ± 0.0015	28.607 ± 0.204
hydrophobic plasma treatment	99.00 ± 0.40	1.5787 ± 0.0013	4.394 ± 0.012



(a)-(b): Fabrication process and the prototype of the PPX-IOL; (b)-(e): The customizable optical and biofunctional properties of PPX-IOL.

complica-tions.

Currently, an increasing num-ber of people suffer from cataract disease, and ap-proximately 10 million IOLs are implanted world-wide each year. There is high demand for the development of new IOL devices with proper-ties to fulfill different optical and bio-logical requirements of each patient. The design parame-ters for the PPX-IOL device are flex-ible, modifications are simple, and most important of all, the optical and biological properties are customizable to a specific patient's needs. This PPX-IOL device may pave the way to the next generation of biomedical op-tics products.

Reference

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A novel western blotting device using thin-film direct coating with suction (TDCS) originally invented at NTU

Western blotting (WB) is widely used in life sci-ence studies and clin-ical diagnoses to detect target proteins in tested samples, such as cells or tissues, via specific antibody–antigen interactions. However, reducing both of the high material consumption costs, such as expensive antibodies, and long operation times, is still necessary to break through the WB efficiency bottleneck, espe-cially in mass detection process-es.