Introduction
Since DNA has the excellent characteristics beside the molecular memory, DNA was expected to be used in many fields. We have successfully prepared ion conductive DNA films with the aid of poly(ethylene oxide) (PEO) or ionic liquids. This ion conductive DNA was prepared as flexible and transparent films. In this study, we prepared all solid state electrochromic device (ECD) with these ion conductive DNA films.

Experimental
Prussian blue (PB) was used as an electrochromic material in this system. The PB film was electrodeposited on the ITO glass electrode in an aqueous ferric ferriyanide solution mixture of 20mM K₃Fe(CN)₆, FeCl₃, and 10mM HCl. Pt and Ag wire were used as working and reference electrodes, respectively.

DNA potassium salt isolated from salmon milt was added to DNA (5 to 20 EO unit/base pair) in water. The solution was cast on Teflon plate, and dried under air and in vacuo for 1 day. The ionic conductivity of the obtained films was measured by complex impedance method, Schlumberger Solartron 1260. All solid state ECDs were prepared by sandwiching DNA film with ITO glass electrode and PB coated ITO glass electrode.

Results and Discussion
We prepared ion conductive DNA films with the aid of PEO/salt or ionic liquids. The obtained DNA films were transparent and flexible. In order to precede electrochemical redox reaction of PB based ECD, alkali metal cation are required. Accordingly, ECDs equipped with DNA film containing ionic liquid showed no color change even efficient given potentials. On the other hand, PEO/salt mixture was suitable for this kind of ECD. It is easy to prepare non-volatile electrolyte solution by mixing PEO with inorganic salt such as KClO₄. In order to determine a Teflon plate, and dried under air and in vacuo for 1 day. The ionic conductivity of the obtained films was measured by complex impedance method, Schlumberger Solartron 1260. All solid state ECDs were prepared by sandwiching DNA film with ITO glass electrode and PB coated ITO glass electrode.

Preparation and characterization of electrochromic device using ion conductive DNA films
Takeshi Kakibe, Naomi Nishimura and Hiroyuki Ohno
Department of Biotechnology, Tokyo University of Agriculture & Technology, Koganei, Tokyo 184-8588, JAPAN
e-mail : ohno@cc.tuat.ac.jp
Tel & FAX (+)81-42-388-7024

Fig.1 Temperature dependence on the ionic conductivity of DNA/PEO₃₀₀(13 EO unit/base pair)/KClO₄(1mol% to EO unit).

Fig.2 UV-vis spectra of ITO-PB DNA/PEO/KClO₄(5mol%)/ITO-cell. Potential was driven between +2.6V and -2.6V with the interval of 20 s.