Supporting Information for

Real-time humidity-sensing properties of ionically conductive Ni(II)-based metallo-supramolecular polymers

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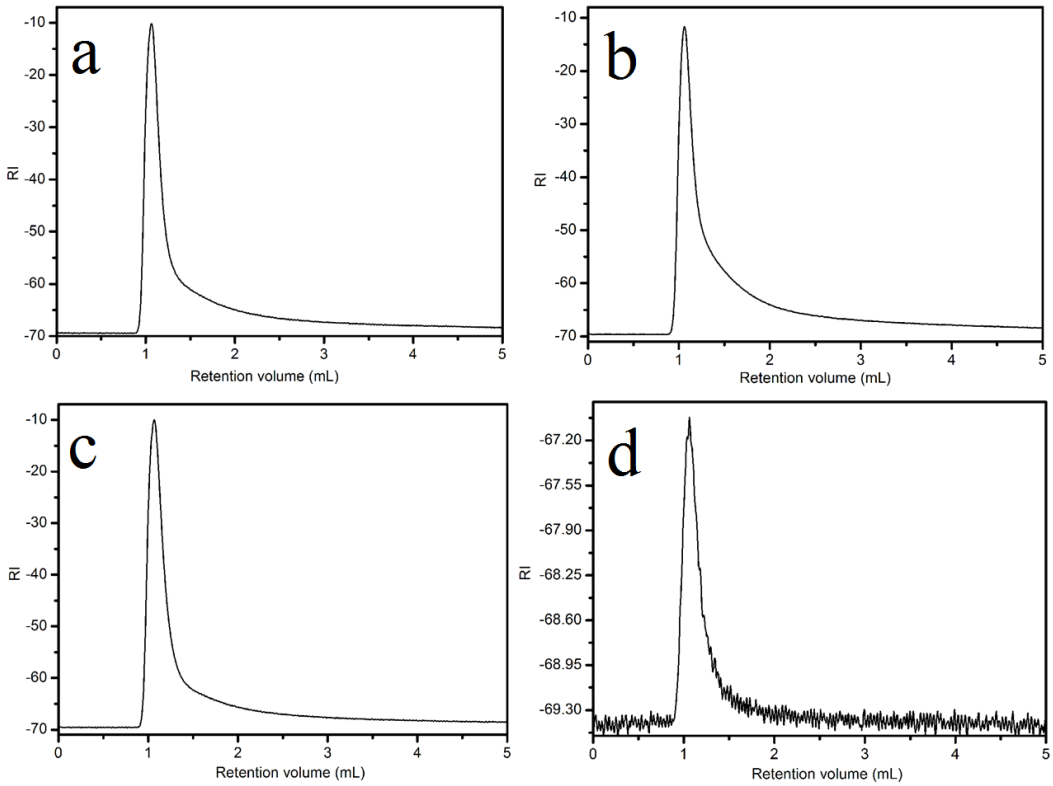


Fig. S1. (a-d) The refractive index data in the SEC-viscometry–RALLS measurement of acetonitrile solutions of **polyNi1-4** at room temperature.

Ellipsometry

The detailed analysis of the ellipsometry experiment is explained below.

1. A glass substrate without any polymer film (Figure S3).
2. General oscillator model: thick film sample (an unknown very high concentration of a metallo-supramolecular polymer): Since the optical constants of such kind of metallo-supramolecular polymers were not available in the literature, we carried out additional experiment to measure the optical constant of such polymers. The model can be used for a variety of metallo-supramolecular polymer films.

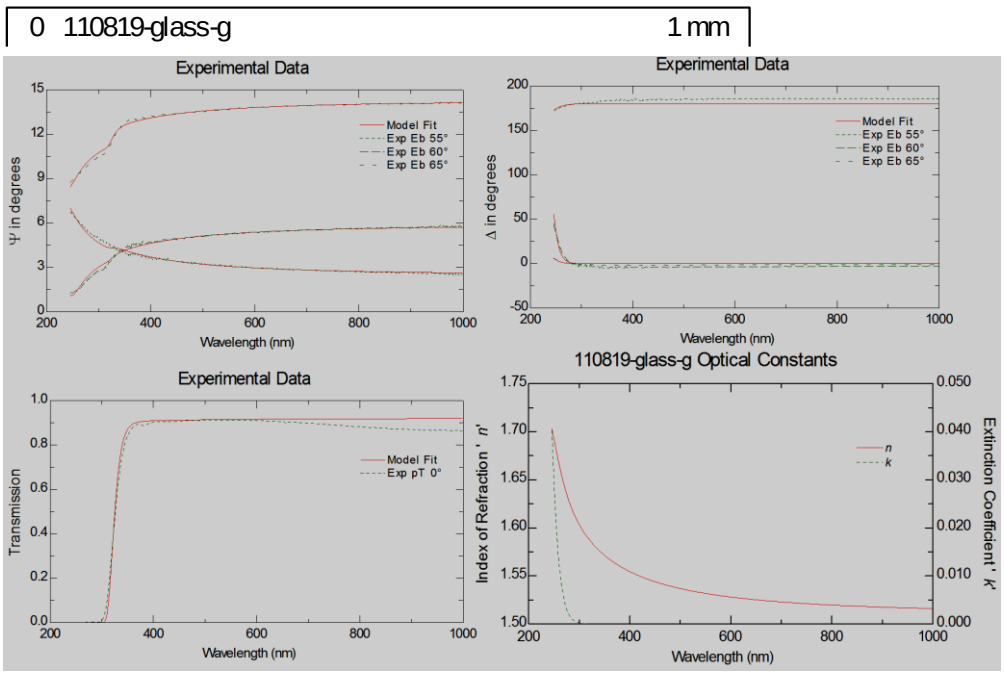


Fig. S2. Ellipsometry data for a glass substrate without any polymer film.

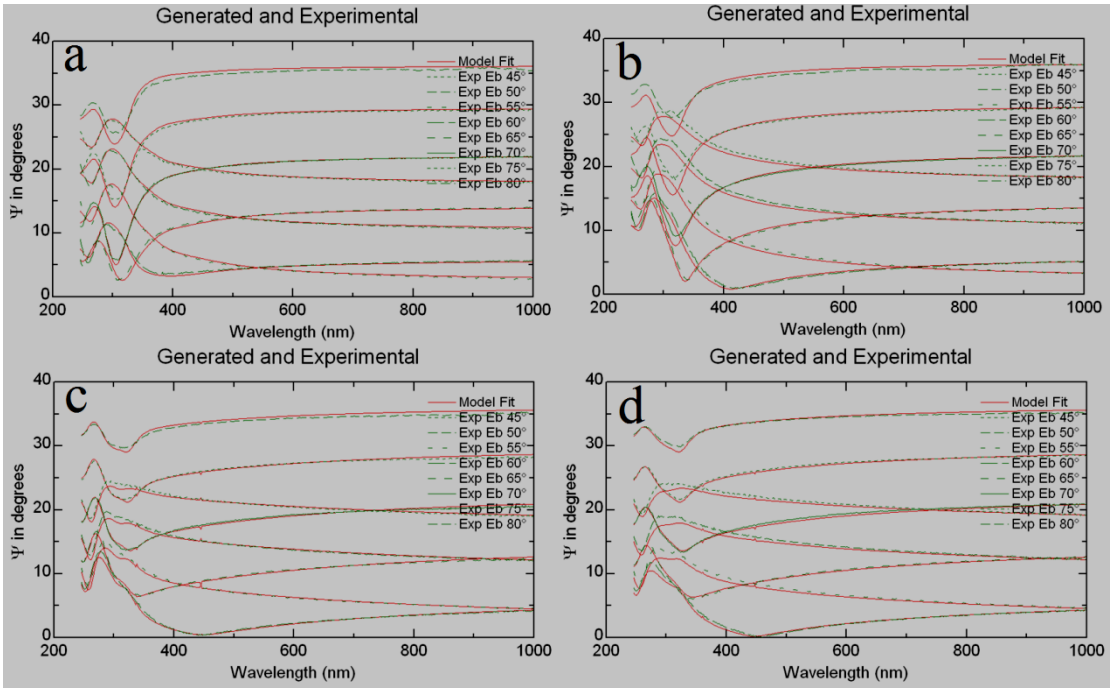
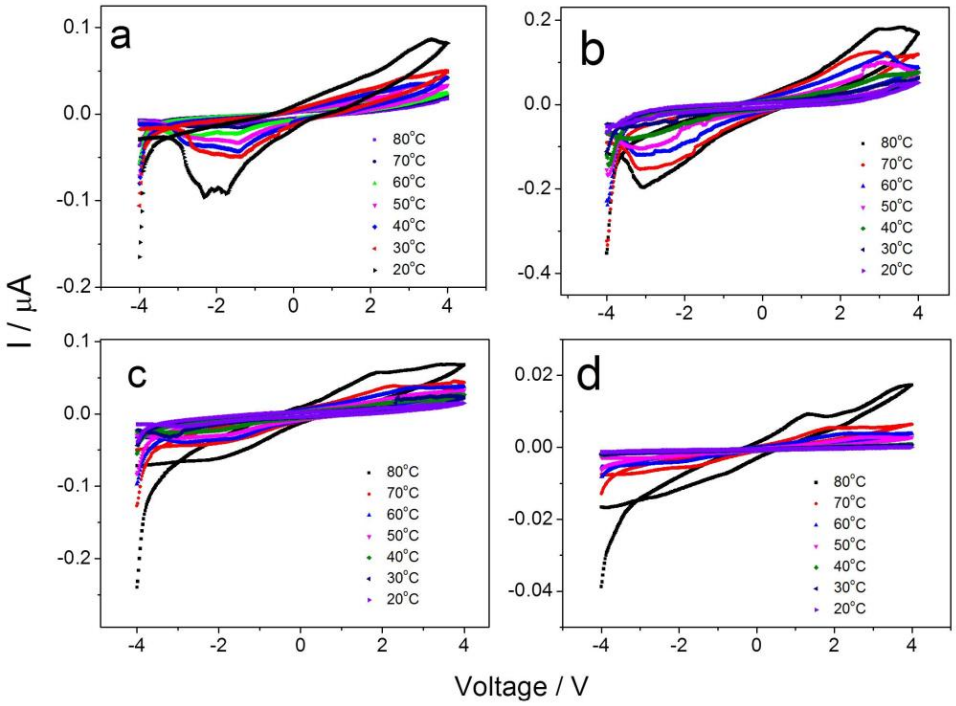


Fig. S3. (a-d) Ellipsometry data for **polyNi1-4** films on a glass substrate. The thicknesses of the **polyNi1-4** films were determined to be 30.0, 46.1, 68.8 and 67.1 nm, respectively. The polymer films were prepared by drop-casting 10 µL of the polymer solution (solvent: acetonitrile and ethanol (1:1), 2 $mgml^{-1}$)).



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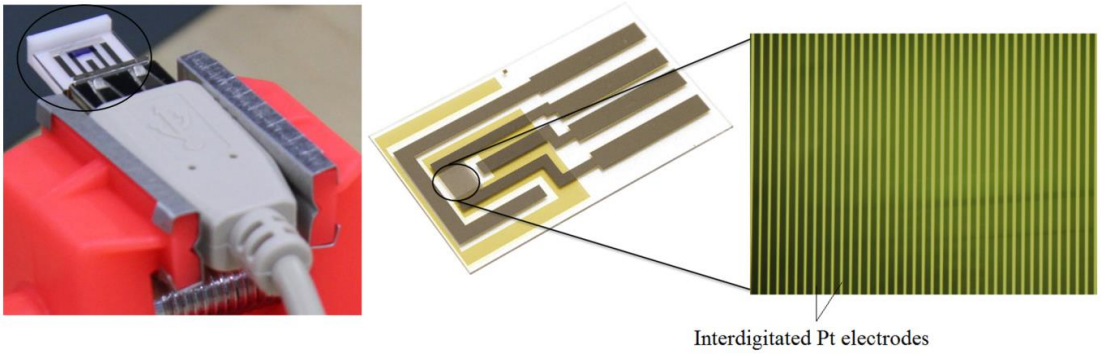

Fig. S5. A humidity sensor using an interdigitated Pt electrode, which can be fixed in a normal USB slot type for easy connection, bought from BAS Inc. Japan for humidity sensing experiment with a **polyNi1** thin film.

References:

(1) (a) A. A. Mohammed, **2008**, http://www.iasj.net/iasj?func=fulltext&aId=39056. (b) C. C. Addison, B. M. Gatehouse *J. Chem. Soc.* 1960, 613.

(2) http://research-archive.liv.ac.uk/1362/16/McIntyreLau_Oct 2009_1362_(Part_8).

(3) C. B. Jong, H. H. Chung *Bull. Korean Chem. Soc.* 2005, **26**, 1395.

(4) M. Chiper, M. A. R. Meier, J. M. Johannes, U. S. Schubert *Macromol. Chem. Phys.* 2007, **208**, 679.