Supporting Information for

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

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

**Fig. S3.** (a-d) Ellipsometry data for polyNi\textsuperscript{1-4} films on a glass substrate. The thicknesses of the polyNi\textsuperscript{1-4} 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\textsuperscript{-1})).

**Fig. S4.** (a-d) I-V plots (forward and reverse sweeps) for polyNi\textsuperscript{1-4} films at different temperatures.

**Fig S5.** A humidity sensor made from 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 polyNi\textsuperscript{1} thin film.
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 mg ml\(^{-1}\)).
Fig. S4. (a-d) $I$-$V$ plots (forward and reverse sweeps) for polyNi1-4 films at different temperatures.

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