Electronic Supplementary Information

Electrochemical Synthesis of a Nanohybrid Film Consisting of Stacked Graphene Sheets and Manganese Oxide as Oxygen Evolution Reaction Catalyst

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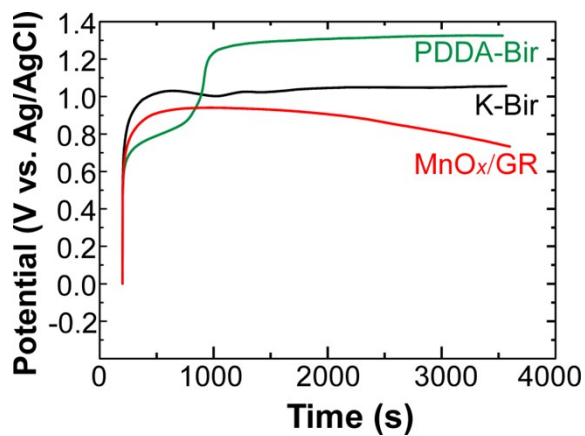
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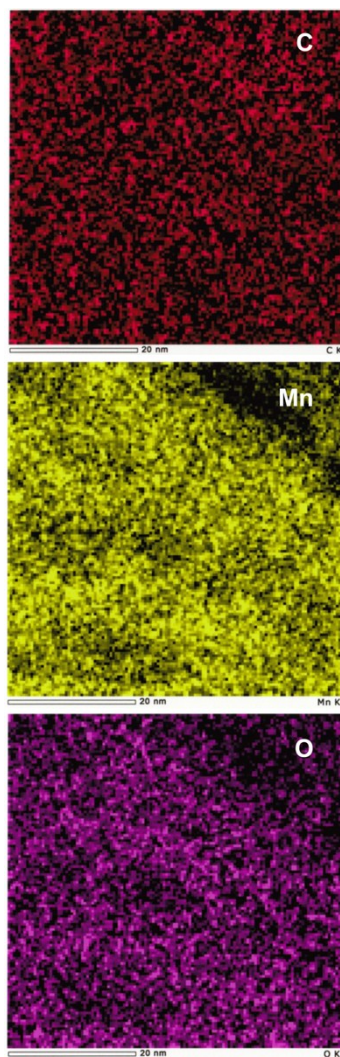
Fig. S1 EDS mapping of C (red), Mn (yellow), and O (purple) elements in the cross section of the electrodeposited film with PDDA-GR$^+$.
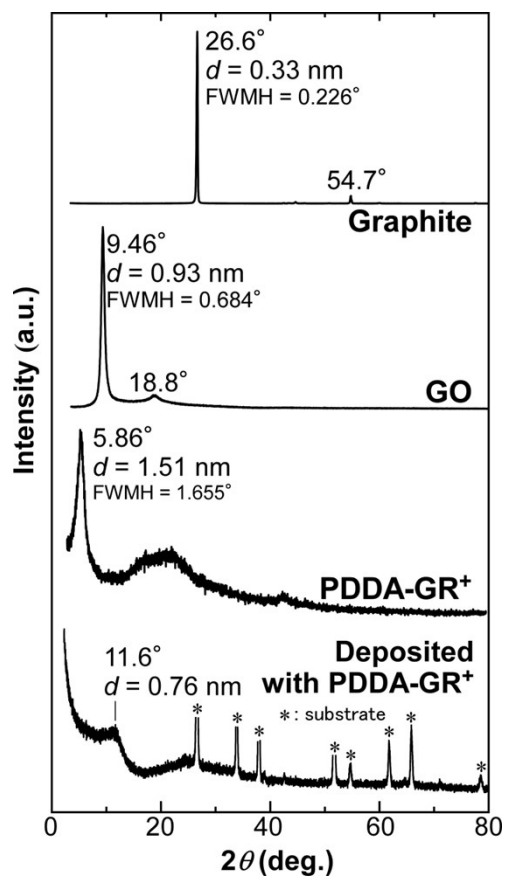
Fig. S2 XRD patterns of graphite, GO, and PDDA-GR$^+$ in a powder form and that of the electrodeposited film with PDDA-GR$^+$.

Fig. S3 Potential-time curves obtained for the electrolysis of aqueous Mn^{2+} ions in the presence of K$^+$, PDDA$^+$, and PDDA-GR$^+$ at a constant anodic current density of 0.06 mA cm^{-2}.

We conducted another stability test using a HR-103A rotating disk electrode system (Hokuto Denko). MnO_x/GR film was loaded on a glassy carbon disk electrode (0.20 cm^2) by the similar procedure described in the main text. The modified electrode was subjected to potential cycling for 1,000 cycles between 1.2 and 2.1 V at a scan rate of 100 mV s^{-1} in 0.1 M KOH solution, and the rotating rate was 1600 rpm. The anodic curves at 1st, 500th, and 1,000th cycles are depicted in **Fig. S4**. Note that the activity of the catalyst film remained unchanged at least 1,000 cycles."
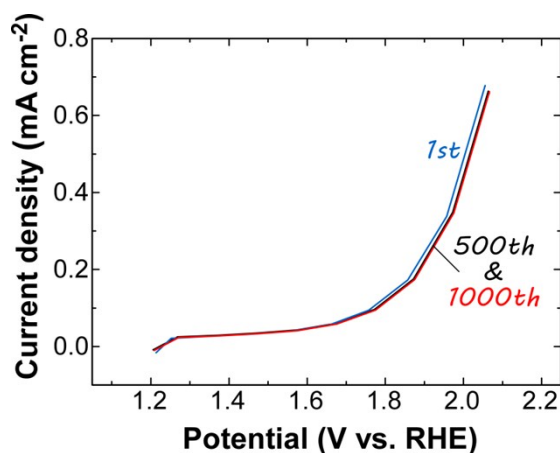
Fig. S4 Stability test for MnO_x/GR film-modified grassy carbon electrode in 0.1 M KOH solution. Anodic curves were recorded at 1st, 500th, and 1000th cycles in the potential cycling at a scan rate of 100 mV s^{-1} between 1.2 and 2. 1 V.