Electronic Supplementary Material (ESI) for Journal of Materials Chemistry A.

Supporting Information

Chemical Compatibility of Polymer Binders with Reversible Anionic Redox Reaction in Lithia-based Cathodes†

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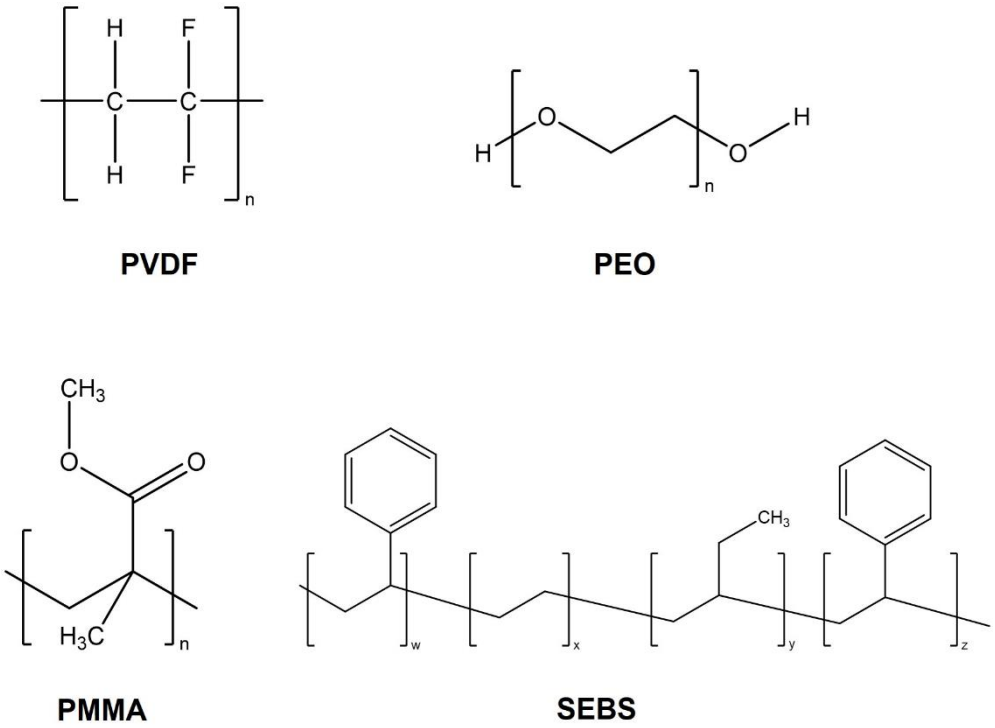

Fig. S1 Chemical structures of polymers studied herein.

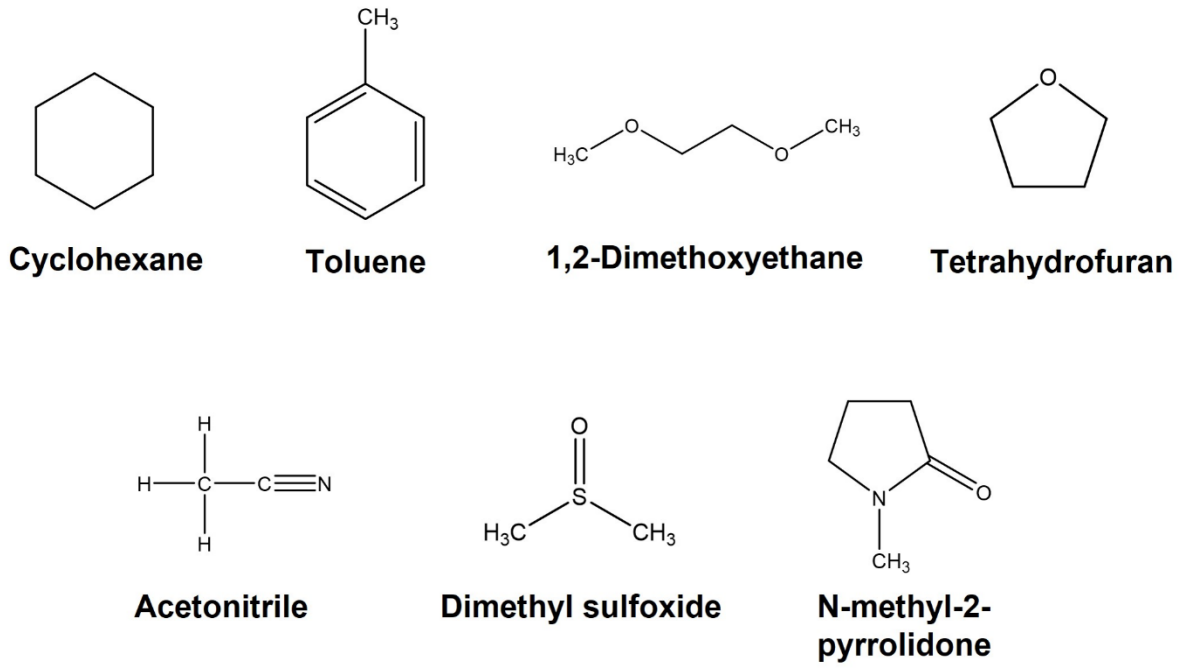

Fig. S2 Chemical structures of various organic solvents studied herein.

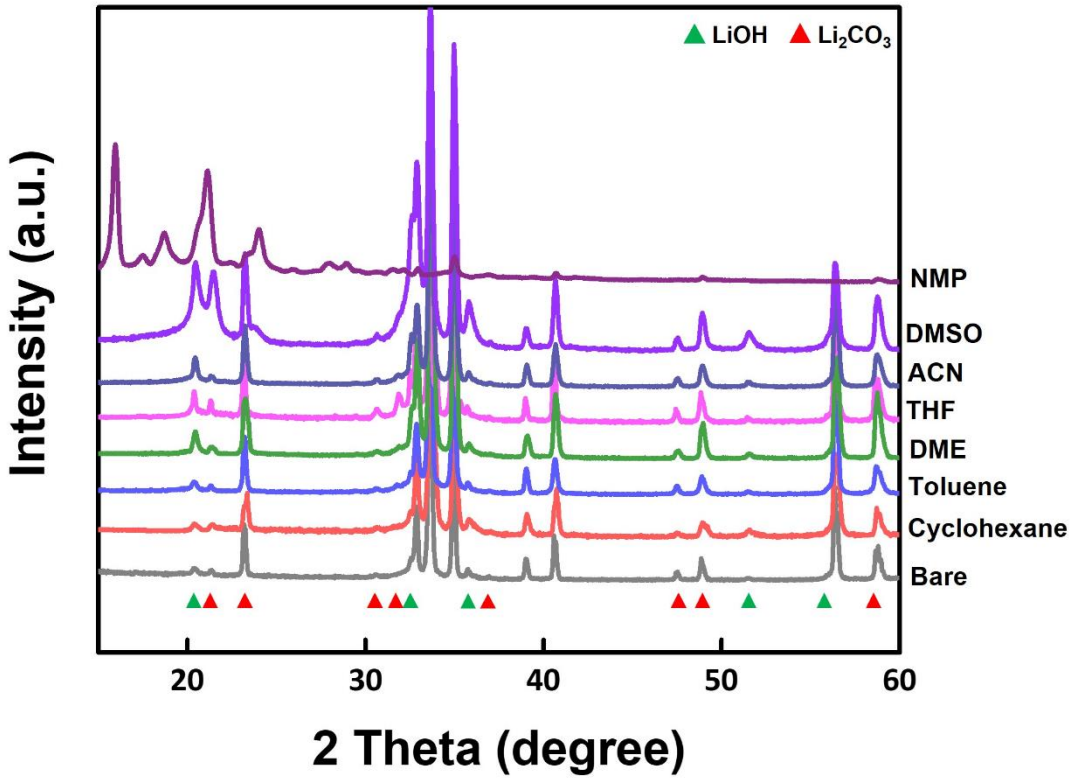

Fig. S3 XRD patterns of pristine lithia and lithia after treatment in various organic solvents.

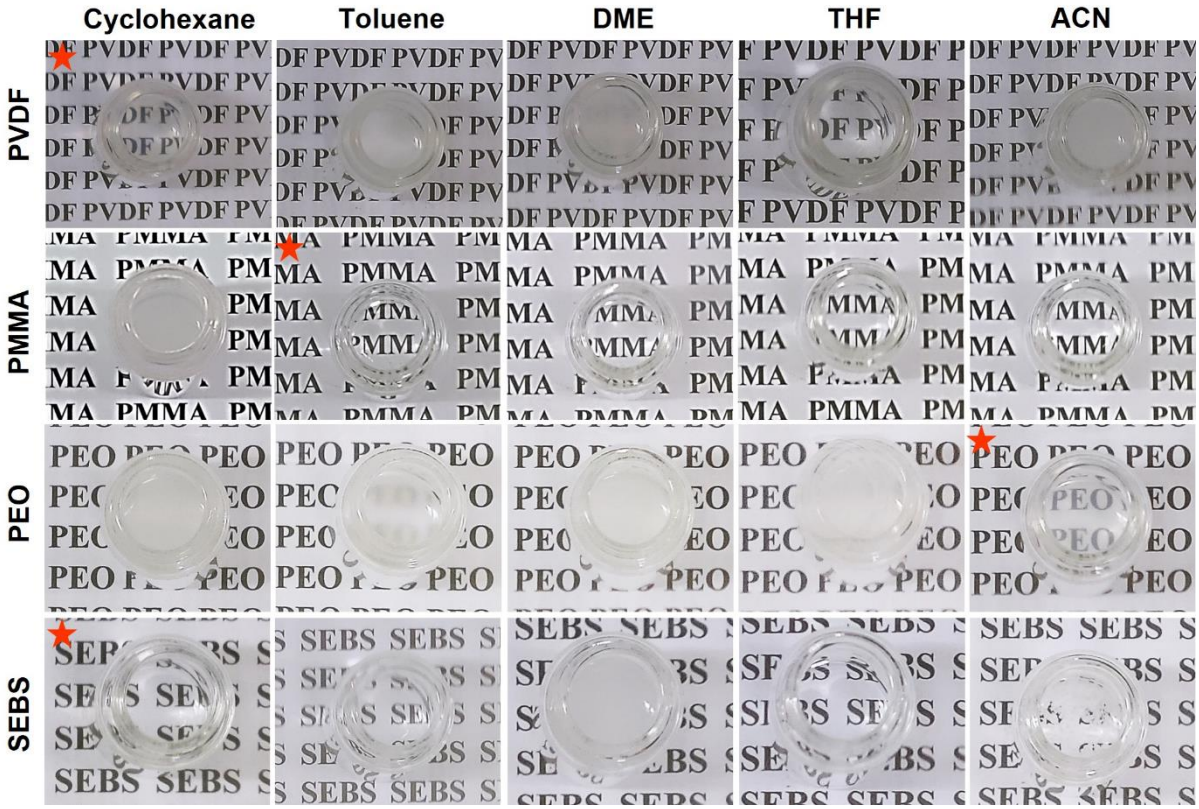

Fig. S4 PVDF, PMMA, PEO, and SEBS polymer solutions in different organic solvents of cyclohexane, toluene, DME, THF, and ACN. The red-star-marked combinations are the polymer solution candidates for further evaluations.

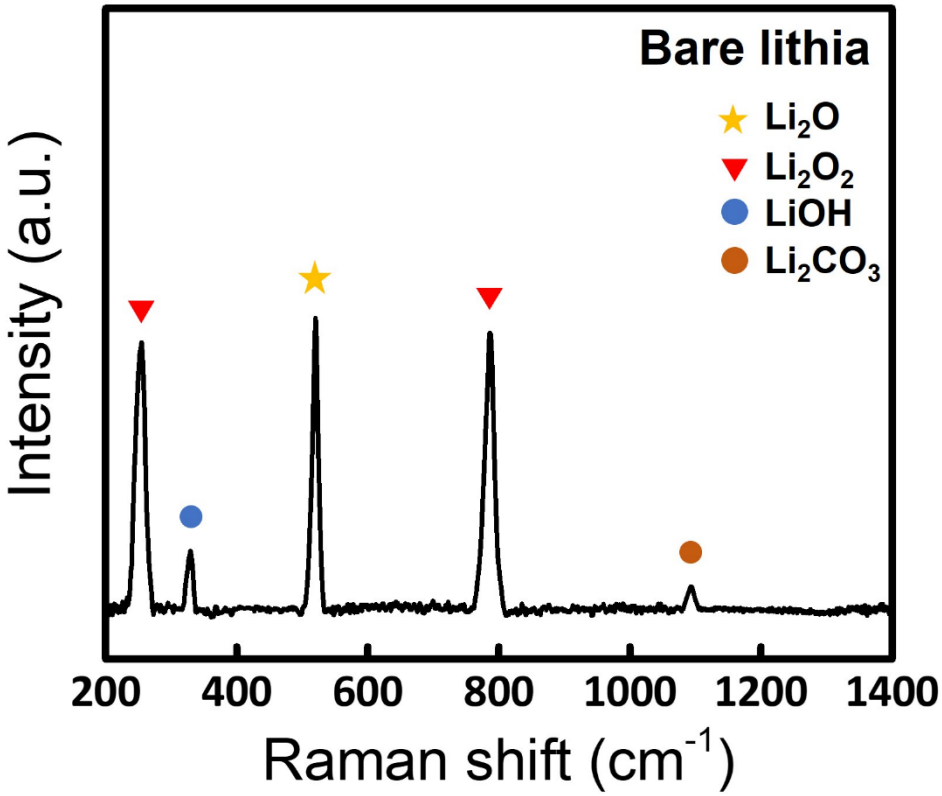

Fig. S5 Raman spectrum of the pristine heat-treated lithia.

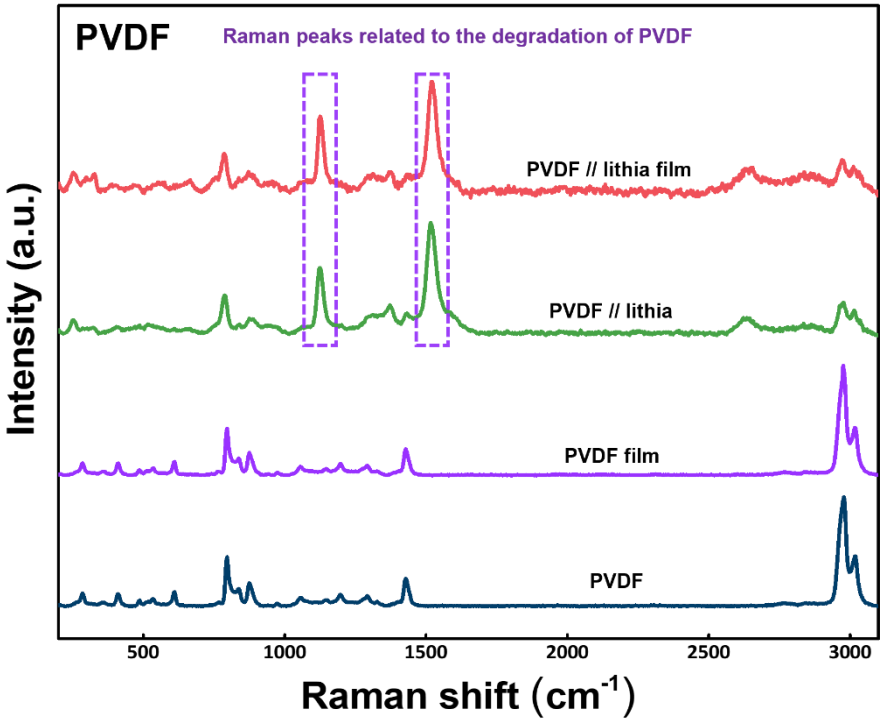

Fig. S6 Raman spectra of PVDF powder, PVDF film prepared with cyclohexane, the powder mixture of PVDF and lithia, and the composite film of PVDF and lithia prepared with cyclohexane.

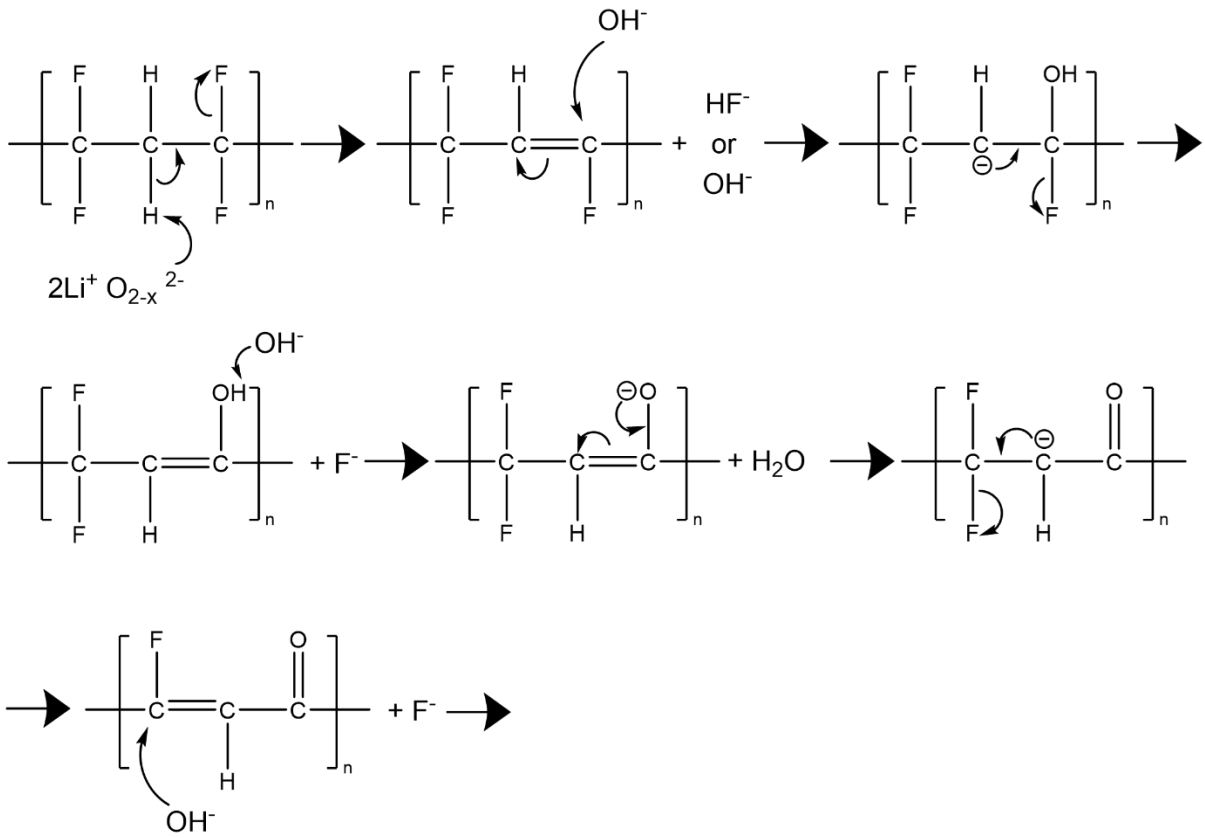

Fig. S7 Possible mechanisms of PVDF degradation.

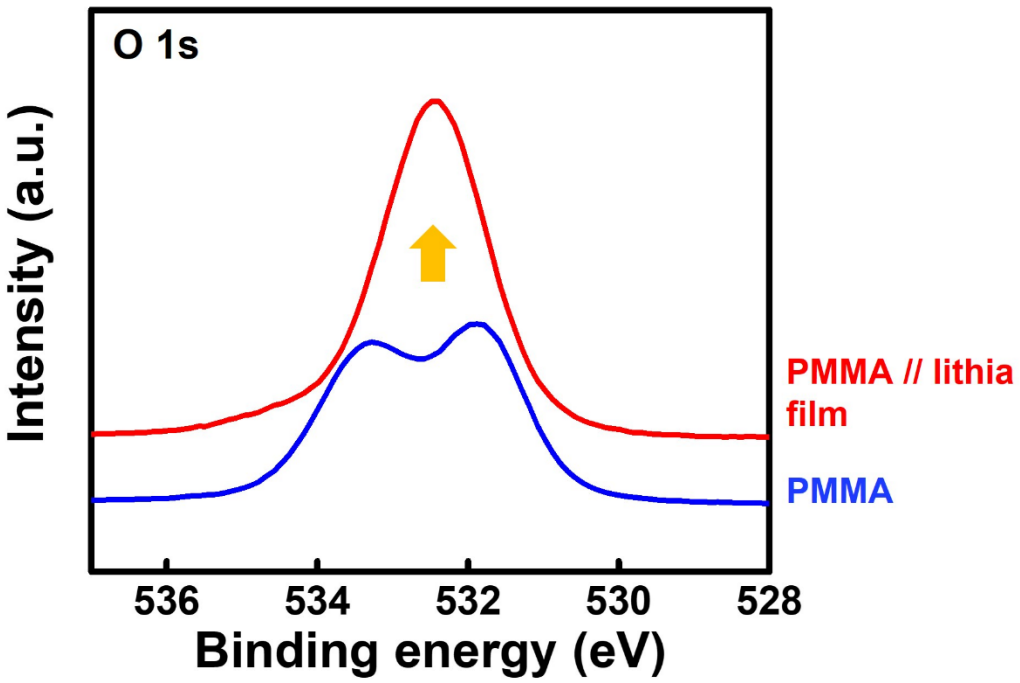

Fig. S8 O1s XPS profiles of PMMA powder (blue) and the composite film of PMMA and lithia prepared with toluene (red).

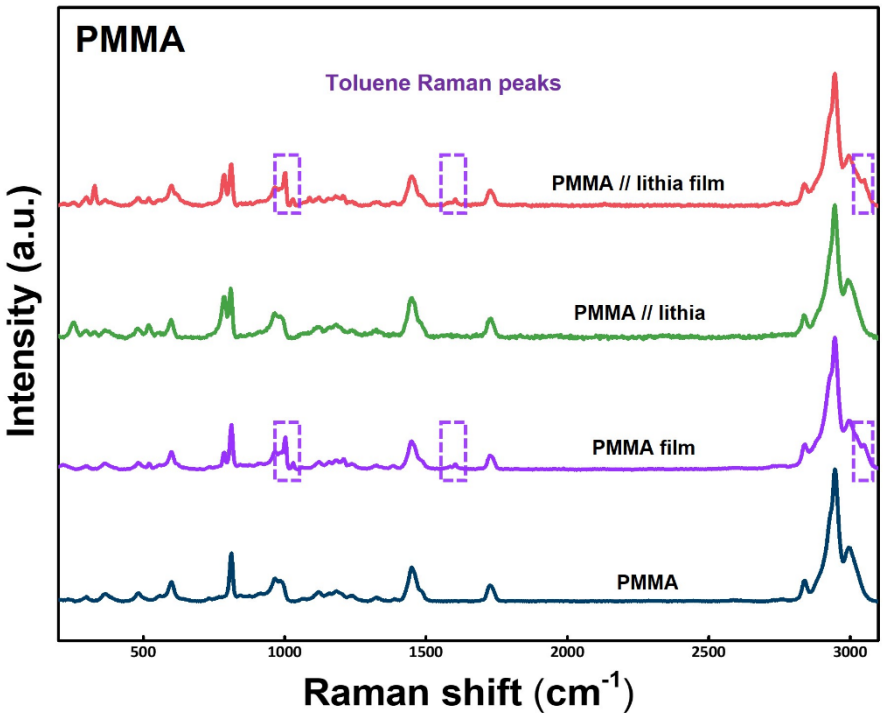

Fig. S9 Raman spectra of PMMA powder, PMMA film prepared with toluene, the powder mixture of PMMA and lithia, and the composite film of PMMA and lithia prepared with toluene.

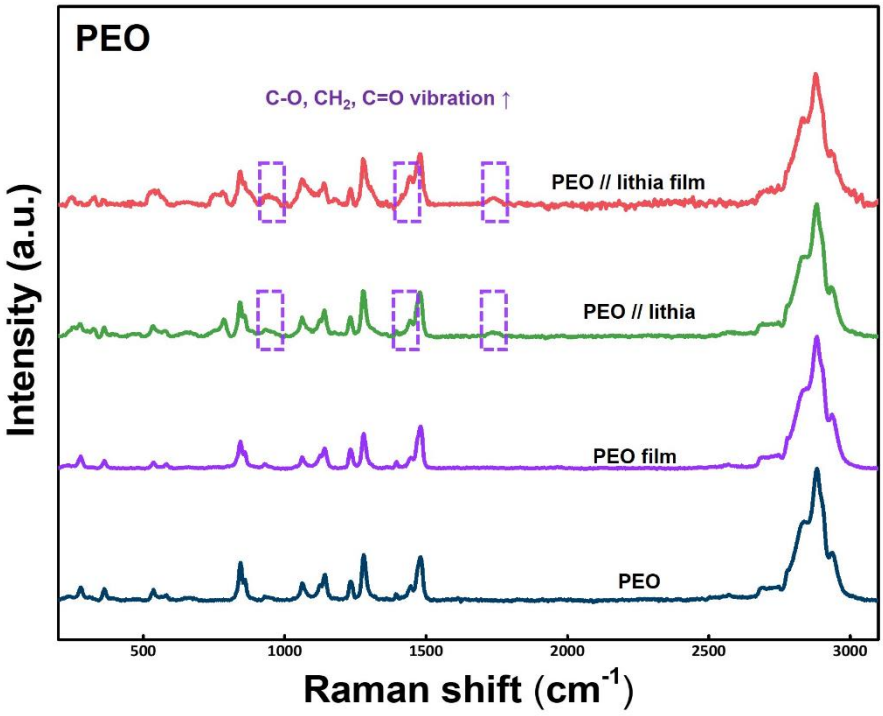

Fig. S10 Raman spectra of PEO powder, PEO film prepared with ACN, the powder mixture of PEO and lithia, and the composite film of PEO and lithia prepared with ACN.

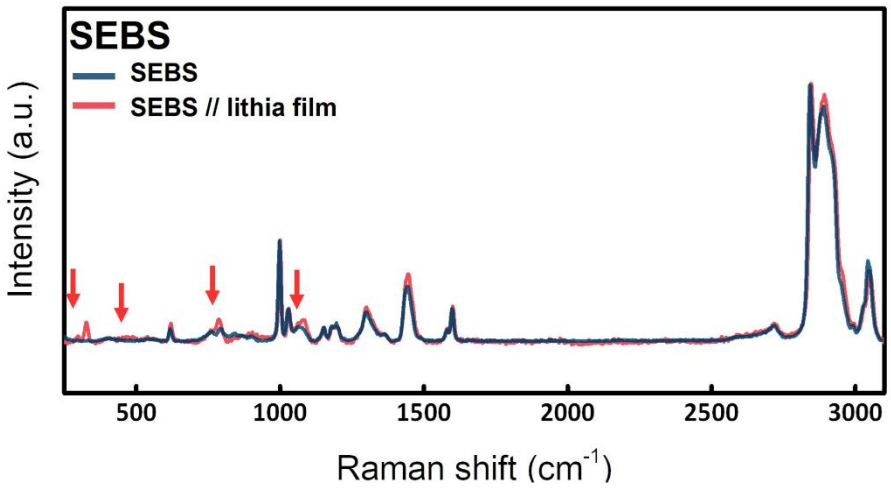

Fig. S11 Raman spectra of SEBS powder (blue) and the composite film of SEBS and lithia prepared with cyclohexane (red). The red arrows indicate the base picks of lithia.

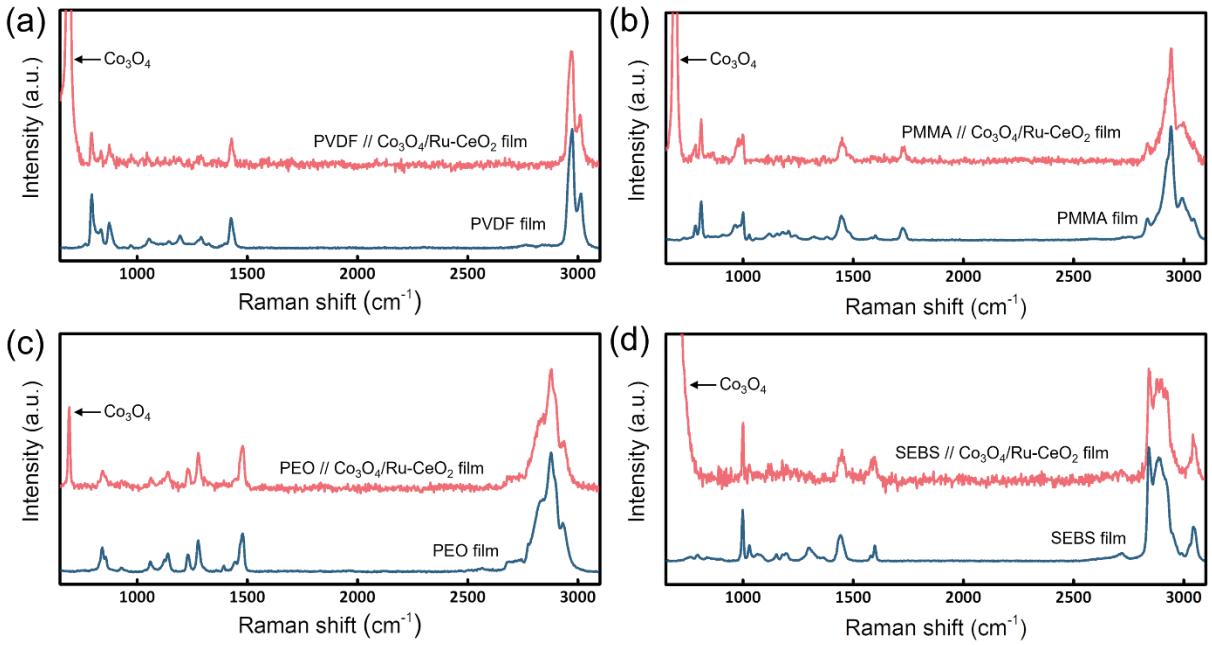

Fig. S12 Raman spectra of the binder films and composite films of Co_3O_4/Ru-CeO_2 prepared with (a) PVDF–cyclohexane, (b) PMMA–toluene, (c) PEO–ACN, and (d) SEBS–cyclohexane binders.

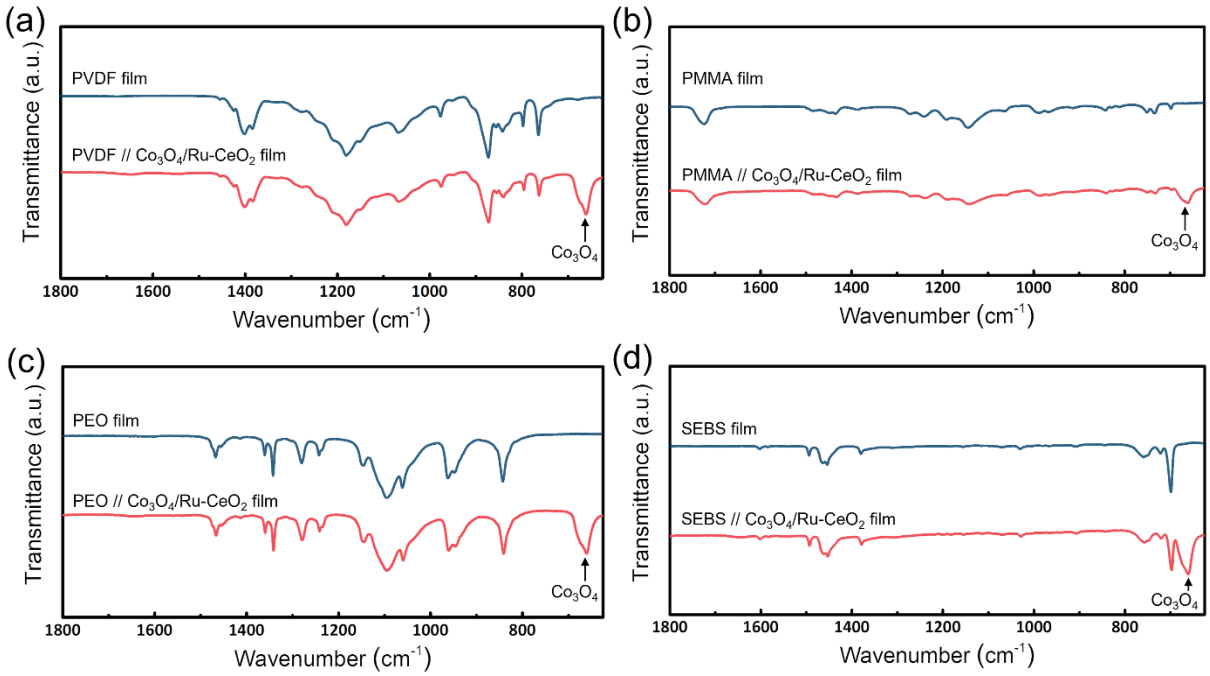

Fig. S13 FT-IR spectra of the binder films and composite films of Co_3O_4/Ru-CeO_2 prepared with (a) PVDF–cyclohexane, (b) PMMA–toluene, (c) PEO–ACN, and (d) SEBS–cyclohexane binders.