

Supporting information for

Study of Fluorine Substituted Phenyl Based Complex as 3V-electrolyte for Mg Batteries

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Reference [S1], Gaussian 09, Revision A.1, M. J. Frisch, G. W. Trucks, H. B. Schlegel, G. E. Scuseria, M. A. Robb, J. R. Cheeseman, G. Scalmani, V. Barone, B. Mennucci, G. A. Petersson, H. Nakatsuji, M. Caricato, X. Li, H. P. Hratchian, A. F. Izmaylov, J. Bloino, G. Zheng, J. L. Sonnenberg, M. Hada, M. Ehara, K. Toyota, R. Fukuda, J. Hasegawa, M. Ishida, T. Nakajima, Y. Honda, O. Kitao, H. Nakai, T. Vreven, J. A. Montgomery, Jr., J. E. Peralta, F. Ogliaro, M. Bearpark, J. J. Heyd, E. Brothers, K. N. Kudin, V. N. Staroverov, R. Kobayashi, J. Normand, K. Raghavachari, A. Rendell, J. C. Burant, S. S. Iyengar, J. Tomasi, M. Cossi, N. Rega, J. M. Millam, M. Klene, J. E. Knox, J. B. Cross, V. Bakken, C. Adamo, J. Jaramillo, R. Gomperts, R. E. Stratmann, O. Yazyev, A. J. Austin, R. Cammi, C. Pomelli, J. W. Ochterski, R. L. Martin, K. Morokuma, V. G. Zakrzewski, G. A. Voth, P. Salvador, J. J. Dannenberg, S. Dapprich, A. D. Daniels, Ö. Farkas, J. B. Foresman, J. V. Ortiz, J. Cioslowski, and D. J. Fox, Gaussian, Inc., Wallingford CT, 2009.

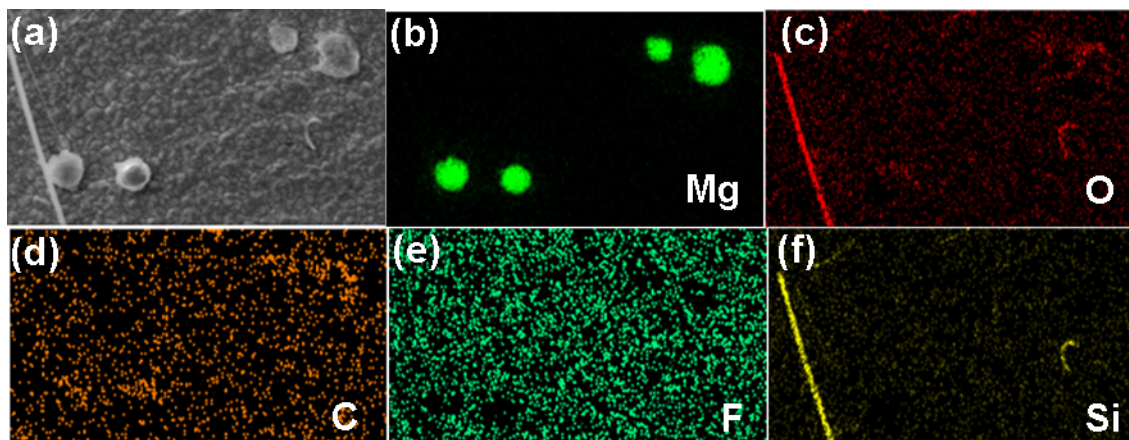


Figure S1. (a) SEM image and corresponding EDX analysis of Mg deposition on electrode using electrolyte $(4\text{-F-PhMgBr})_2\text{AlCl}_3/\text{THF}$: (b) Mg, (c) O, (d) C, (e) F, and (f) Si.

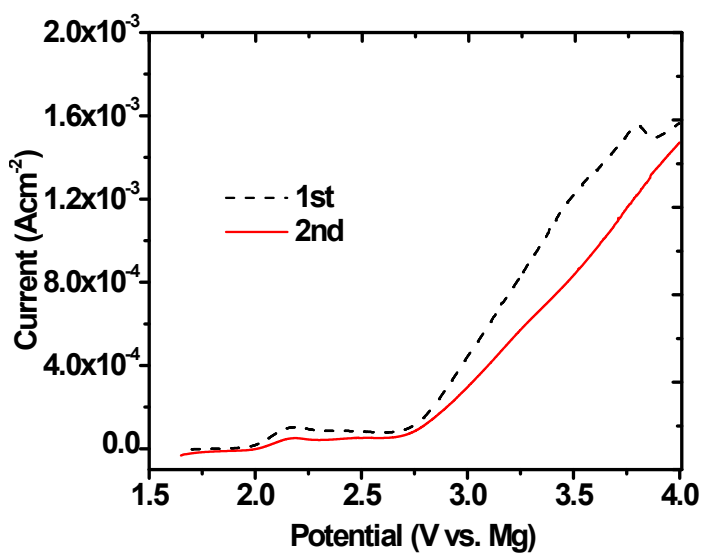


Figure S2. The first and second LSV of Pt in $(2,6\text{-bismethyl-PhMgBr})_2\text{-AlCl}_3/\text{THF}$ electrolyte within the potential range between OCP and 4.0 V (vs. Mg^{2+}/Mg) at voltage scan rates of 1 mVs^{-1} .

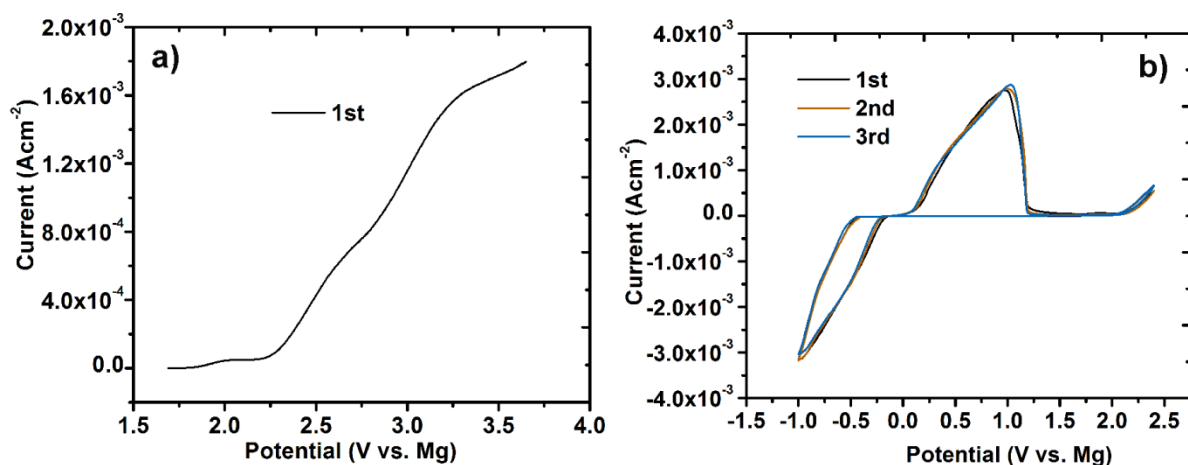


Figure S3. The first LSV scan of Pt in $(\text{HexamethyleneMgBr})_2\text{AlCl}_3/\text{THF}$ electrolyte within the potential range between OCP and 3.75 V (vs. Mg^{2+}/Mg) and corresponding previous three CV cycles between -1 and 2.4 V. (Both of the voltage scan rates are 1 mVs^{-1}).

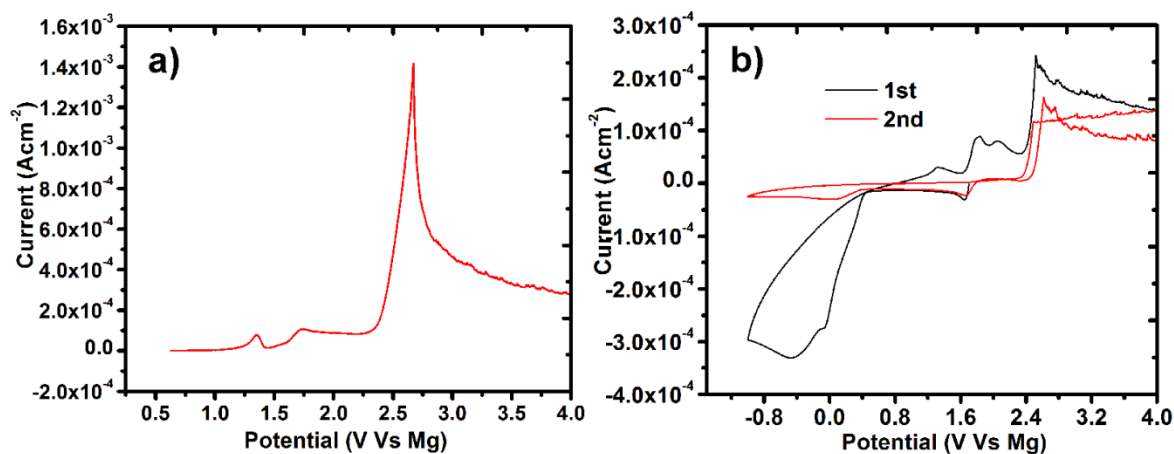


Figure S4. The first LSV scan of Pt in $(3,5\text{-bis(trifluoromethyl)phMgBr})_2\text{AlCl}_3/\text{THF}$ electrolyte within the potential range between OCP and 4.0 V (vs. Mg^{2+}/Mg) and corresponding previous three CV cycles between -1 and 3 V. (Both of the voltage scan rates are 1 mVs^{-1}).