

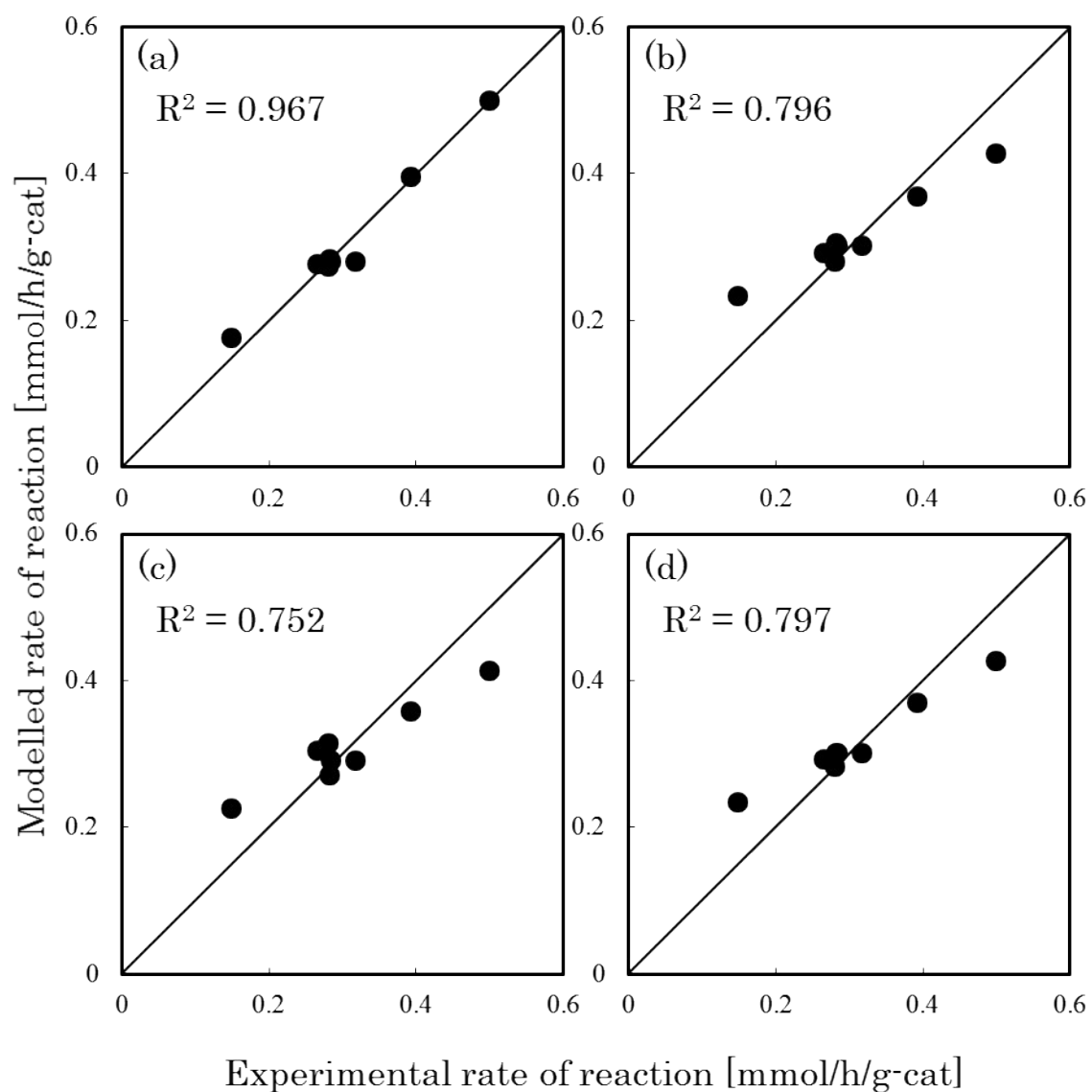
## Electronic Supplementary Information (ESI)

### Kinetic Evidence: Rate-determining Step for Ammonia Synthesis over Electride-supported Ru Catalysts is No Longer the Nitrogen Dissociation Step

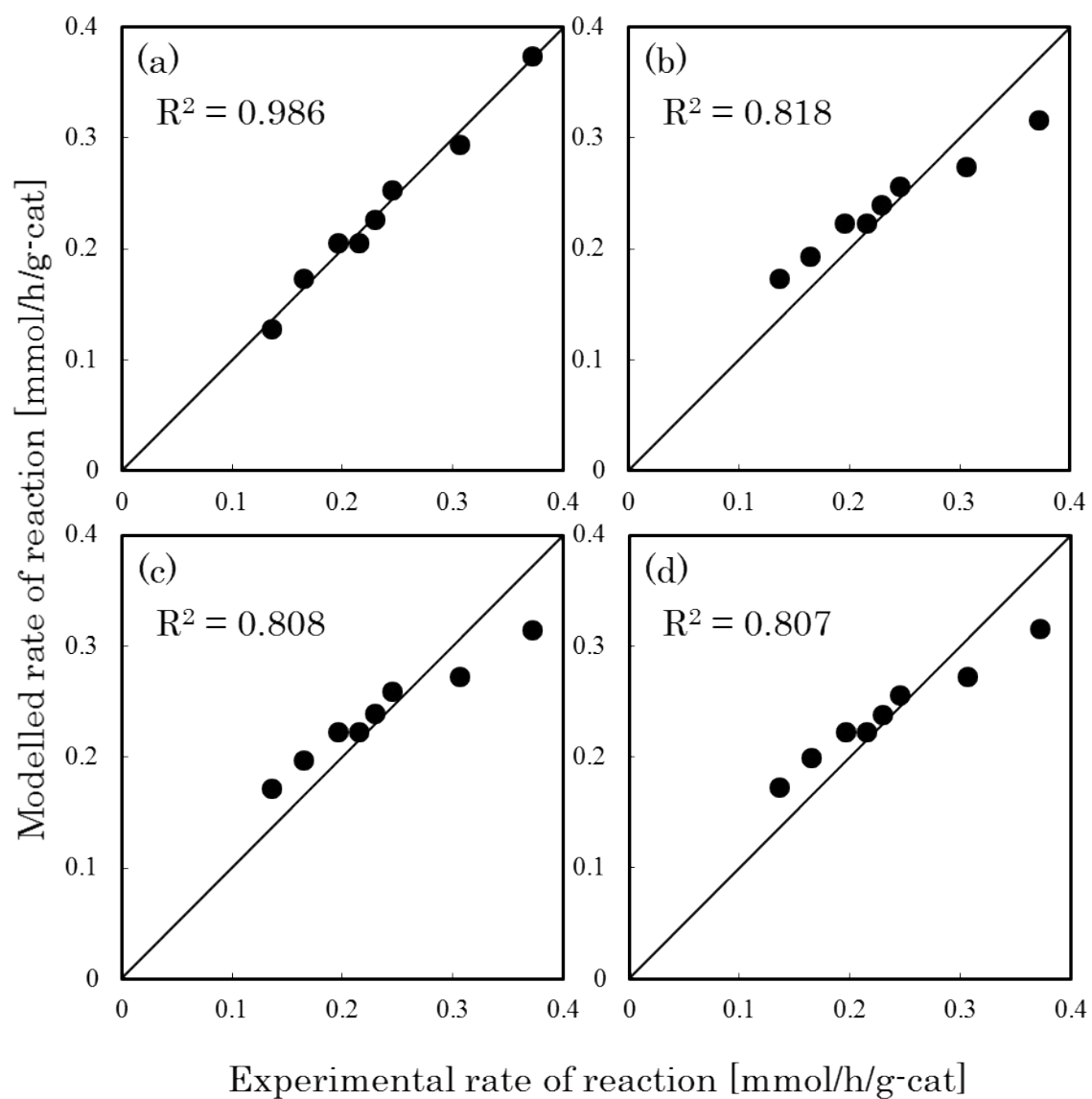
Yasukazu Kobayashi,<sup>a</sup> Masaaki Kitano,<sup>a</sup> Shigeki Kawamura,<sup>a</sup> Toshiharu Yokoyama,<sup>ab</sup>  
Hideo Hosono<sup>\*abc</sup>

- a. Materials Research Center for Element Strategy, Tokyo Institute of Technology, 4259 Nagatsuta, Midori-ku, Yokohama 226-8503, Japan. E-mail: [hosono@mssl.titech.ac.jp](mailto:hosono@mssl.titech.ac.jp)
- b. ACCEL, Japan Science and Technology Agency, 4-1-8 Honcho, Kawaguchi, Saitama 332-0012, Japan.
- c. Laboratory for Materials and Structures, Tokyo Institute of Technology, 4259 Nagatsuta, Midori-ku, Yokohama, 226-8503, Japan.

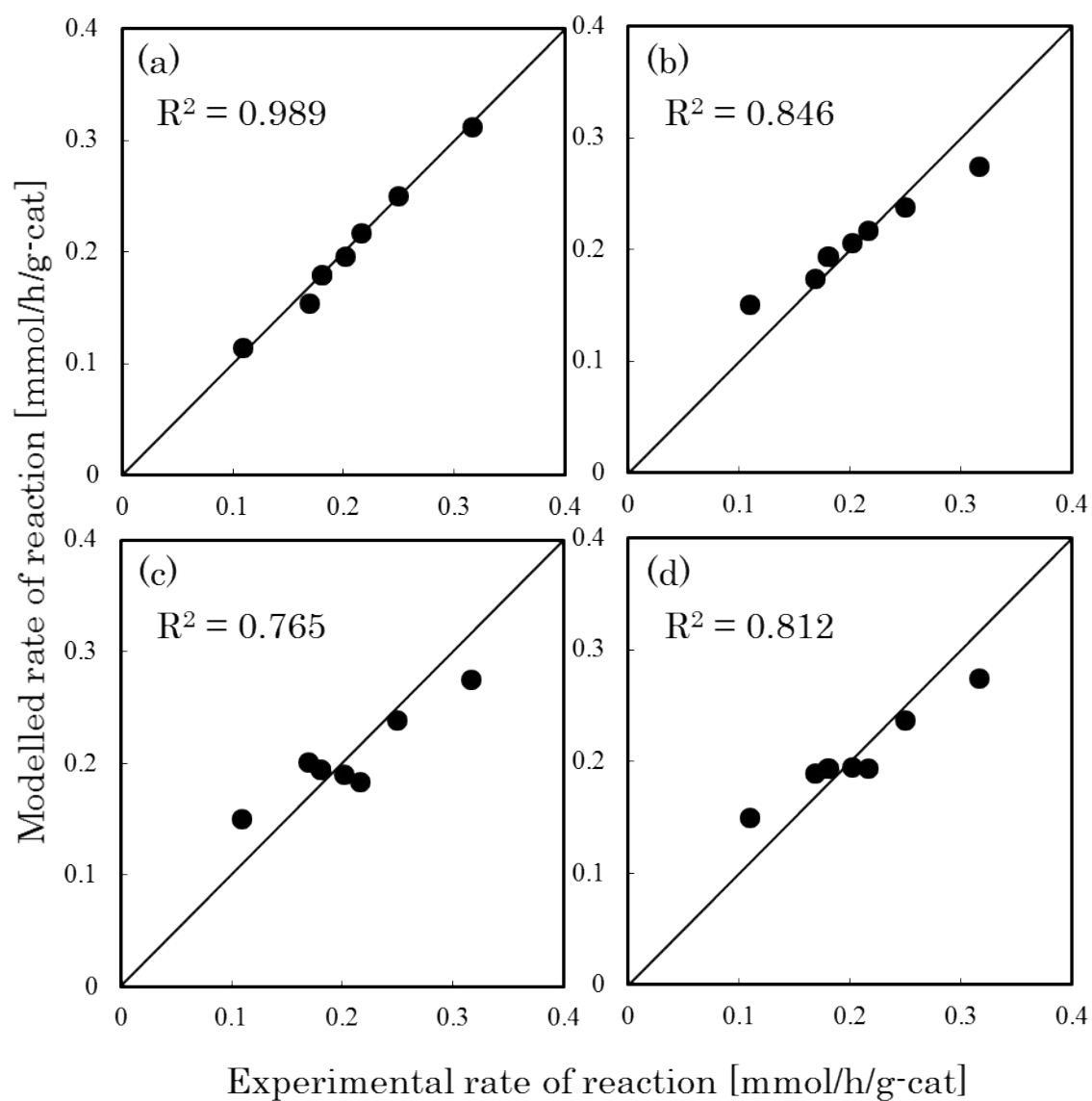
## Figures



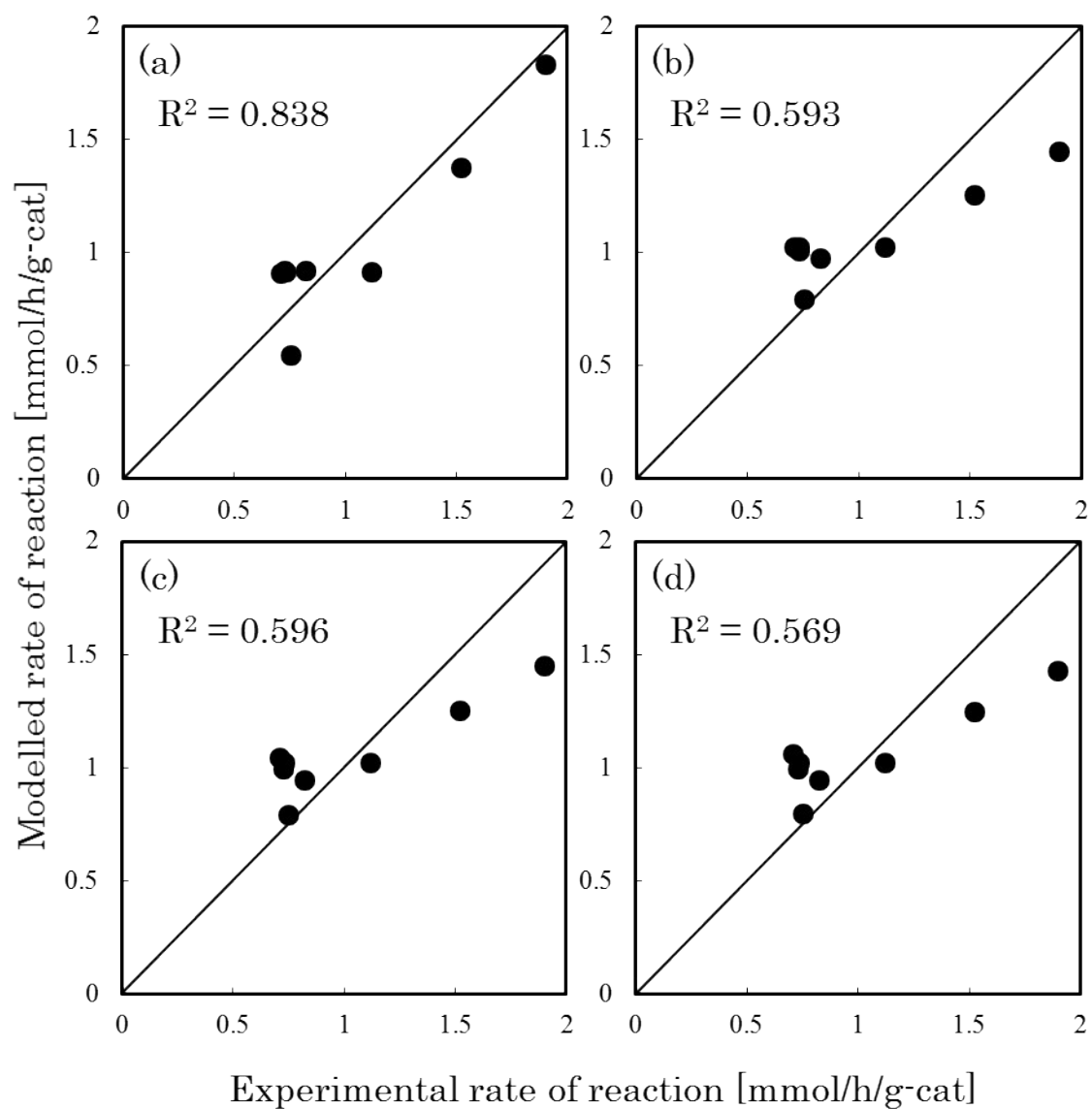
**Fig. S1** Best fit results for reaction rates over Ru/C12A7:O<sup>2-</sup> with respect to the rate equations derived with the RDS assumed to be (a) step 4, (b) step 5, (c) step 6, and (d) step 7.



**Fig. S2** Best fit results for reaction rates over Ru/CaO-Al<sub>2</sub>O<sub>3</sub> with respect to the rate equations derived with the RDS assumed to be (a) step 4, (b) step 5, (c) step 6, and (d) step 7.



**Fig. S3** Best fit results for reaction rates over Ru/MgO with respect to the rate equations derived with the RDS assumed to be (a) step 4, (b) step 5, (c) step 6, and (d) step 7.



**Fig. S4** Best fit results for reaction rates over Ru/CaNH with respect to the rate equations derived with the RDS assumed to be (a) step 4, (b) step 5, (c) step 6, and (d) step 7.