Supplementary Materials

In Situ Evaluation of the Influence of Interstitial Oxygen on the Elastic Modulus of La_2NiO_4

Yuta Kimura [1,*], Takashi Nakamura [1], Koji Amezawa [1], Keiji Yashiro [2] and Tatsuya Kawada [2]

[1] Institute of Multidisciplinary Research for Advanced Materials, Tohoku University, 2-1-1 Katahira, Aoba-ku, Sendai, Miyagi, 980-8577, Japan; yuta.kimura.b2@tohoku.ac.jp
[2] Graduate School of Environmental Studies, Tohoku University, 6-6-04, Aramaki Aoba Aoba-ku, Sendai, Miyagi, 980-8579, Japan
* Correspondence: yuta.kimura.b2@tohoku.ac.jp

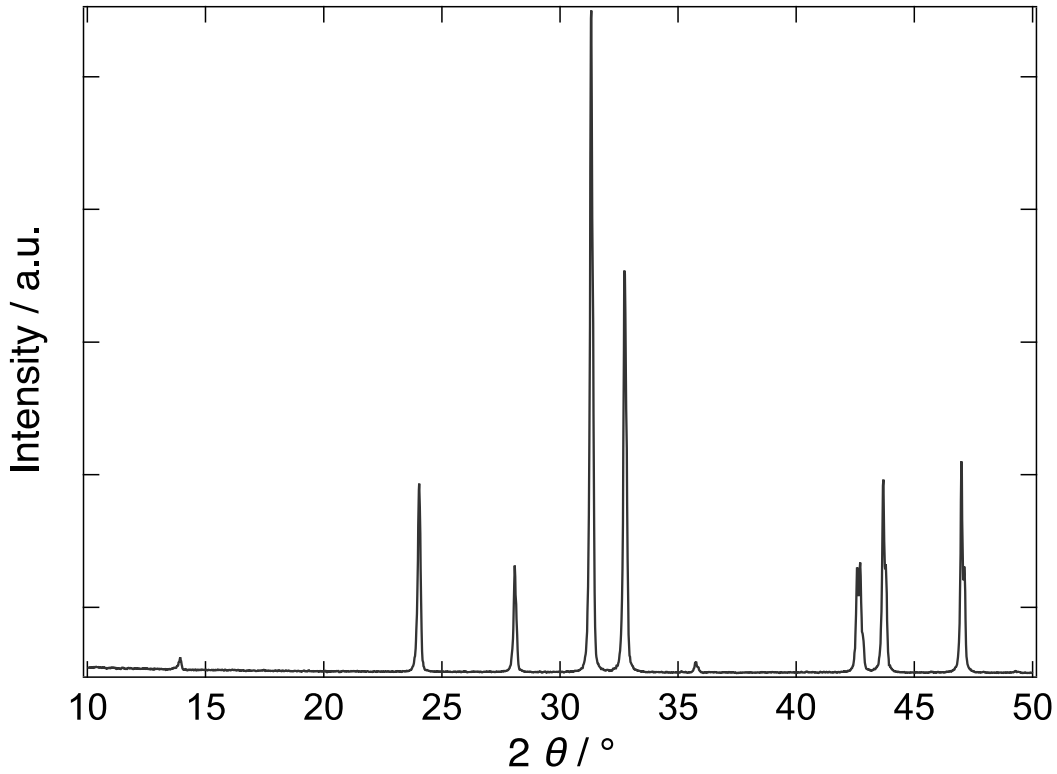

Figure S1. XRD Pattern of the synthesized La_2NiO_4 sample. No impurity peaks were found, and the sample was confirmed to have tetragonal symmetry (space group: I4/mmm).

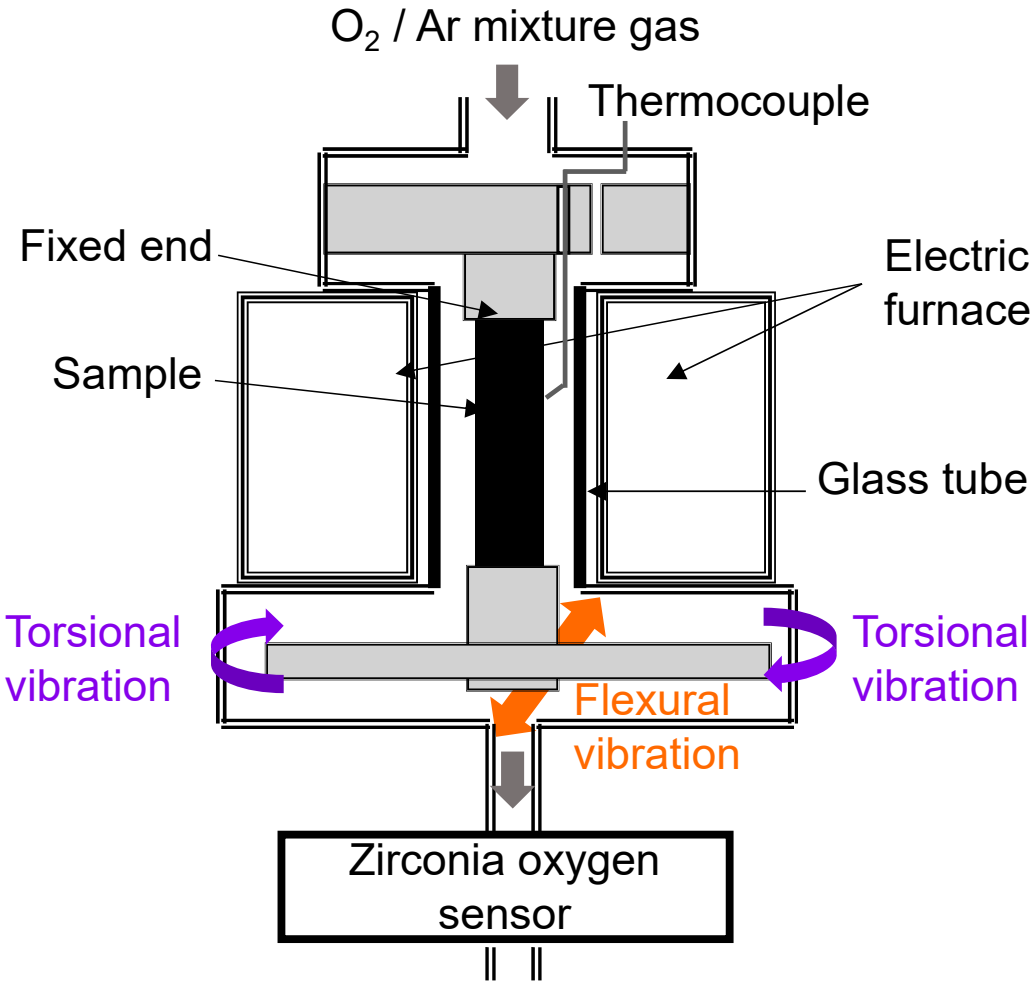

Figure S2. Schematic diagram of the *in-situ* measurements of the Young's modulus, shear modulus and internal friction using the resonance method. Flexural and torsional vibrations with the frequency of 10^1 ~ 10^2 Hz were induced from one end of the sample by actuators while another end of the sample was fixed. The Young's and shear moduli of the sample are determined from the respective resonance frequencies and the sample dimension. The internal friction was calculated from the natural decay of the flexural vibration. The ambient temperature was controlled by an electric furnace and a thermocouple. To control the oxygen partial pressure ($P(O_2)$) around the sample, mixture gases of O_2 and Ar was injected from the top of the apparatus. The $P(O_2)$ of the outlet gas was monitored by an yttria-stabilized zirconia oxygen sensor.