



Local Structures of Multicomponent Electrocatalysts

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1. 背景と研究目的

Multicomponent materials have been increasingly attractive in electrocatalysis because of their promising performance resulted from the synergetic effects among the various compositions^[1]. However, the unclear interactions among the various components, especially for the surface species for catalyzing reactions, hindered the in-depth understandings of structure-performance relationships, which thus requires advanced surface characterizations for further explorations. In this work, a surface-sensitive method, i.e., conversion electron yield (CEY), was applied to obtain the X-ray absorption spectroscopy (XAS) to reveal the local surface structures of the as-prepared multicomponent electrocatalysts. The disclosed different electronic configurations will be contributable to revealing the influence on electrocatalytic performance and pinpointing the key component(s) for directing future rational design of highly efficient electrocatalytic materials.

2. 実験内容

The multicomponent electrocatalysts were prepared as films. Conversion electron yield (CEY) method was used to collect the XAS of the various elements, with measuring time 2 min / each element.

3. 結果および考察

The local structures of multicomponent electrocatalysts with different compositions (herein noted as M1 and M2, respectively) were explored by the surface-sensitive CEY method^[2], and the Ni K-edge results were shown in Fig. 1. It is evident that the intensity of white line for M1 was higher than that of M2, suggesting different electronic structures between M1 and M2^[3]. In addition, the fluctuations after the absorption edge in both M1 and M2 shared a similar shape. This indicated analogous coordination configurations for the Ni sites in the two electrocatalysts. Therefore, the distinct local structure implied from the XAS results, especially the electronic configurations, demonstrated distinct surface property and thus different electrocatalytic performance for the multicomponent electrocatalysts.

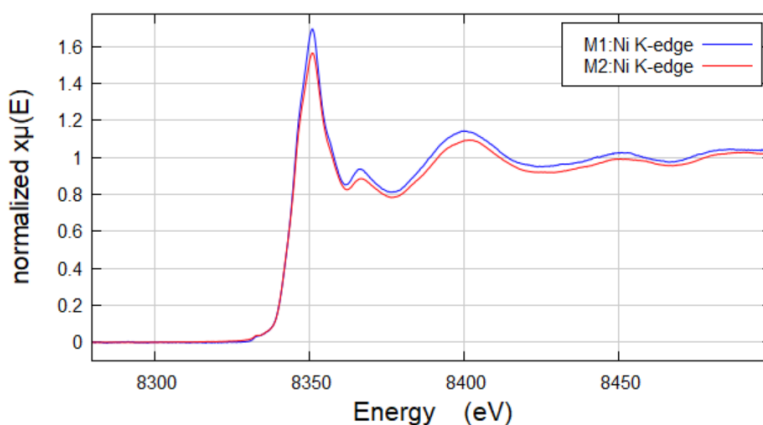


Fig. 1. XAS results of M1 and M2 for Ni K-edge.

4. 参考文献

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