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Fundamental research on the voltammetry of polycrystalline gold

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PROPOSITIONS (STELLINGEN)

Accompanying the thesis

Fundamental Research on the Voltammetry of Polycrystalline Gold

1. While metal oxides possess inner and outer components, the different reduction peaks of metal oxides do not necessarily reflect the existence of these oxide layers. (Chapter 2)
2. To understand how oxides change in real environments, it is more important to study how metals are connected within oxides than to focus on where the metal atoms are located in the structure. (Chapter 3)
3. Because the strength of the interfacial electric field is directly controlled by the excess free charge density, rather than the electrode potential, it is crucial to examine the distribution of the excess free charge on the electrode surface, rather than just focusing on the precise potential of zero charge. (Chapter 4)
4. When exploring redox reactions that require high overpotentials such as oxygen evolution and reduction, understanding the significant changes occurring in the electrode structure is crucial. (Chapter 2-4)
5. The relationship between current and voltage presented in voltammetry is far more complex than we may imagine, especially when you realize that many of the models to describe these relations include unreasonable assumptions.
6. Pointing out a flaw in a classical model requires not only a clear and accurate explanation of why it is wrong, but also persuasive communication of what is correct.
7. Data never lie; every observation is meaningful, and when we perceive it as disorderly, it might simply be because we haven't fully understood it.
8. Despite numerous discussions on the double layer interface of solid surfaces, we rarely have the opportunity to experimentally test excess free charge changes occurring during electrochemical reactions.
9. A critical reflection on studies from the past may spark our curiosity for continuous exploration.
10. Make your own research the standard instead of always chasing what's currently popular.
11. Focusing on unanswered questions is crucial, as it creates opportunities for the emergence of new scientific breakthroughs.
12. In the face of doubt, we must stand firm and press on, as overcoming obstacles is the duty of the one who proposes.

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