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Propositions

accompanying the dissertation

The Electrochemical Engineering of Anodic Peroxide Production in Alkaline Water Electrolysis

by

Sohan Abhay PHADKE

1. The poor ionic transport in (bi)carbonate-based electrolyzer systems leads to diminishing currents and dramatic changes in reservoir content if not properly mitigated. *This proposition pertains to this dissertation.*
2. The anodic H_2O_2 concentration in a recirculating electrolyzer system can be accurately described by mole balances with input about generation and decomposition rates from straightforward reaction engineering experiments. *This proposition pertains to this dissertation.*
3. Large-scale alkaline water electrolysis with anodically produced H_2O_2 can only improve the economics of green H_2 production if costs and device performance are positively aligned. *This proposition pertains to this dissertation.*
4. Electrochemical engineering research on anodic H_2O_2 reveals that the co-production concept is not exclusively about faradaic efficiency, but rather a combination of multiple performance metrics. *This proposition pertains to this dissertation.*
5. Universities are in desperate need of re-examining their purpose in modern society if they want to effectively fulfill their role.
6. There is currently far too much investment put towards electrochemistry whereas the transition to renewable energy demands investment into electrochemical engineering.
7. The need for perpetual innovation in scientific publication means we lack reproducibility checks of past work, resulting in serious inefficiencies towards scientific progress.
8. Modern scientific authors face the same struggles of digital content creators, and their solutions are unfortunately the same: use hyperbolic titles, overhype the actual content, and prioritize views over substance.
9. Our proliferation of paradigm-shifting technologies is currently outpacing our understanding of the moral implications, meaning that moral virtue is left behind.
10. The IKEA store layout shares the same exploitative methodology as addictive apps, where the longer you stay trapped in them, the more money the company makes.

These propositions are regarded as opposable and defensible, and have been approved as such by the promotors prof. dr. ir. W. de Jong. and dr. ir. J. W. Haverkort.