

The performance of CQD+Sb₂W₆ catalase-like enzyme in inhibiting hydrogen peroxide

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Nanoparticles' catalytic activity and intrinsic ability in generating or scavenging reactive oxygen species in general can be used to show the catalytic activity of natural enzymes. Many nanoparticles with enzyme-like activities have been found, potentially capable of being applied for commercial applications, such as in biosensors, pharmaceutical processes, and the food industry [1]. Compared with natural catalase or artificial CAT enzymes, CAT-like nanozymes have unique properties of low cost, size-dependent properties, high catalytic activity, stability, and easy surface modification[2]. One of the key oxidative threats to oxygen-tolerant organisms is hydrogen peroxide H₂O₂ [3]. Virtually all organisms employ catalases and peroxidases to keep the steady-state level of endogenous H₂O₂ below the threshold of toxicity. Herein, CQD/Sb₂W₆ were used as a catalase, catalyzing the decomposition of hydrogen peroxide to oxygen. CQD/Sb₂W₆ had better stability than natural catalase when they were exposed to solutions with different pH values and temperatures. The activity of the ,CQD/Sb₂W₆ was measured by UV-visible spectroscopy. The prepared Catalase were identified using FE-SEM, DRS, EDS, FT-IR, and PL.

Keywords: Intrinsic, Hydrogen Peroxide, Enzyme-like, Catalase

References

- [1] Tsekhmistrenko, S. I.; Bityutskyy, V. S.; Tsekhmistrenko, O. S.; Polishchuk, V. M.; Polishchuk, S. A.; Ponomarenko, N. V.; Melnychenko, Y. O.; Spivak, M. Y. *Mech. Biosyst.* **2018**, 9 (3), 469–476.
- [2] Xu, D.; Wu, L.; Yao, H.; Zhao, L. *Small* **2022**, 18 (37).
- [3] Wang, Z.; Liu, Y.; Dong, X.; Sun, Y. *ACS Appl. Mater. Interfaces* **2021**, 13 (42), 49974–49981. 1c15043.