

微生物礦化製備高光催化性能之奈米氧化鋅生物白水泥混凝土



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Summary

The main purpose of this research is to use Microbial Induced Precipitation (MIP) to combine nano-zinc oxide with concrete, and the biological method is used to replace the traditional preparation methods such as direct addition and coating of photocatalytic composites. The method can directly synthesize nano-zinc oxide in the cement material, which can make the nano-zinc oxide evenly distributed in the cement material, fill the micro-cracks in the structure, and enhance the strength of the concrete. At the same time, it endows the traditional building materials with photocatalytic properties to produce new multifunctional composite materials.

一、計畫目標

MICP

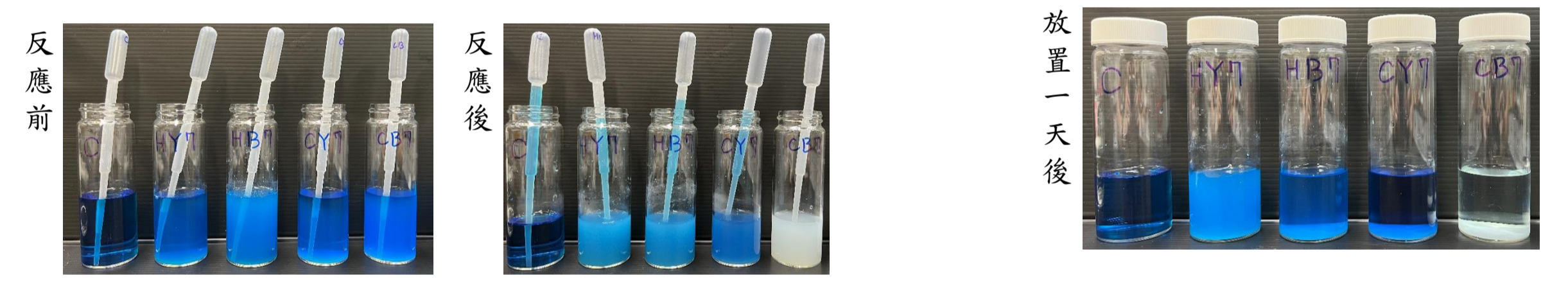
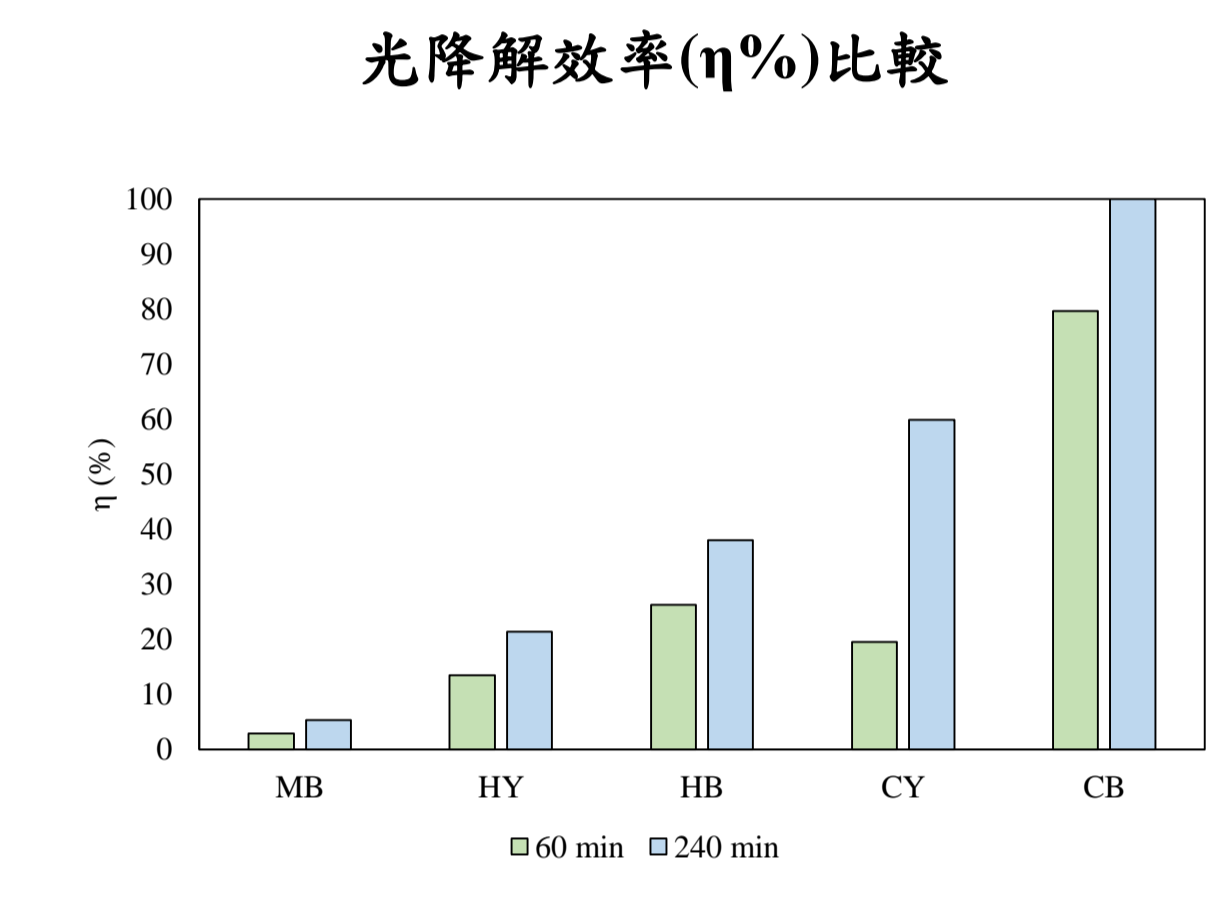
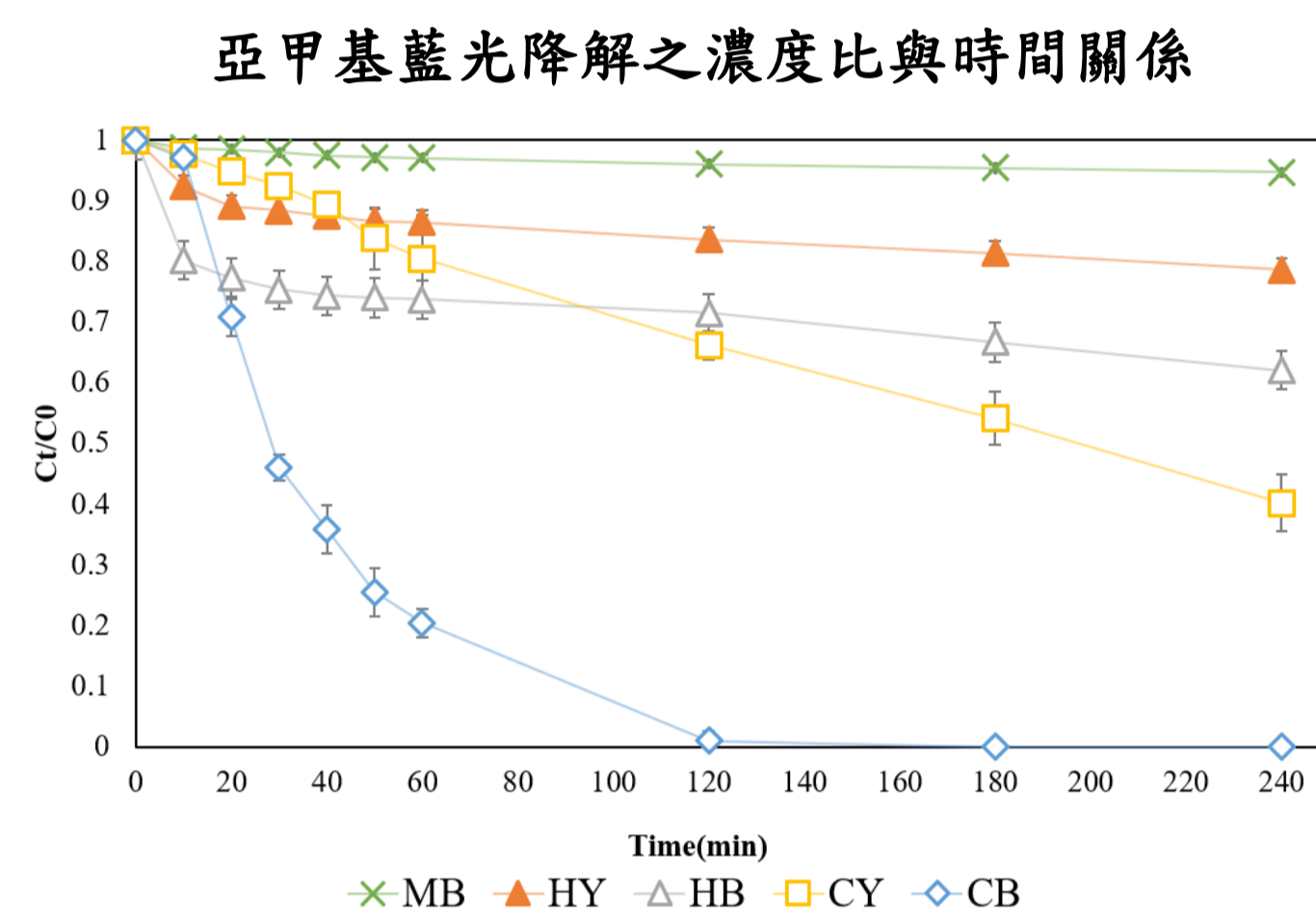
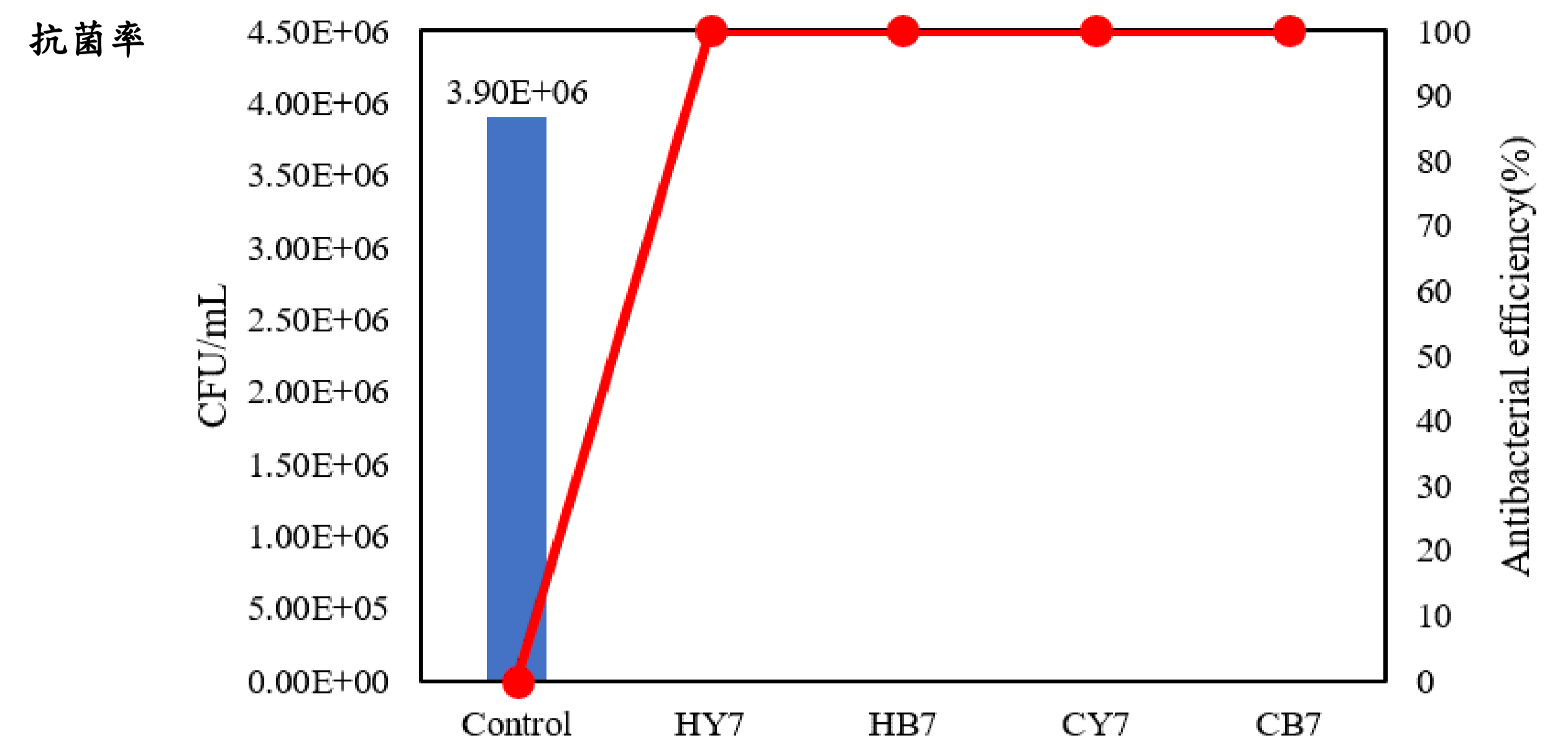
- 混凝土
- CaCO₃

MIP

- Antimicrobial characteristics
- Photocatalytic efficiency
- Self cleaning

- Strength
- Water absorption
- Permeability
- Porosity
- Antimicrobial characteristics
- Photocatalytic efficiency
- Self cleaning

- 混凝土
- CaCO₃
- ZnO



三、後續工作之推動重點與需求

2021.08 - 2021.11: Nano-zinc oxide bio-concrete curing, Nano-zinc oxide bio-concrete production

2021.11 - 2022.01: Material property experiments (CNS 1010, CNS 488, CNS 3763 A2047)

2022.01 - 2022.03: Antibacterial experiment (CNS 13580, CNS 15505)

2022.03 - 2022.05: Hydrophobicity and Photocatalytic experiments (CNS 15378-1, CNS 15378-2, CNS 15094-1-15094-5)

2022.05 - 2022.07: Result analysis, Writing reports and papers

2022.08 - 2022.10: SGS testing (Antibacterial, Fungicidal, Disinfectant, etc.)

2022.10 - 2022.12: Surface attachment virus test, Data analysis and final report writing

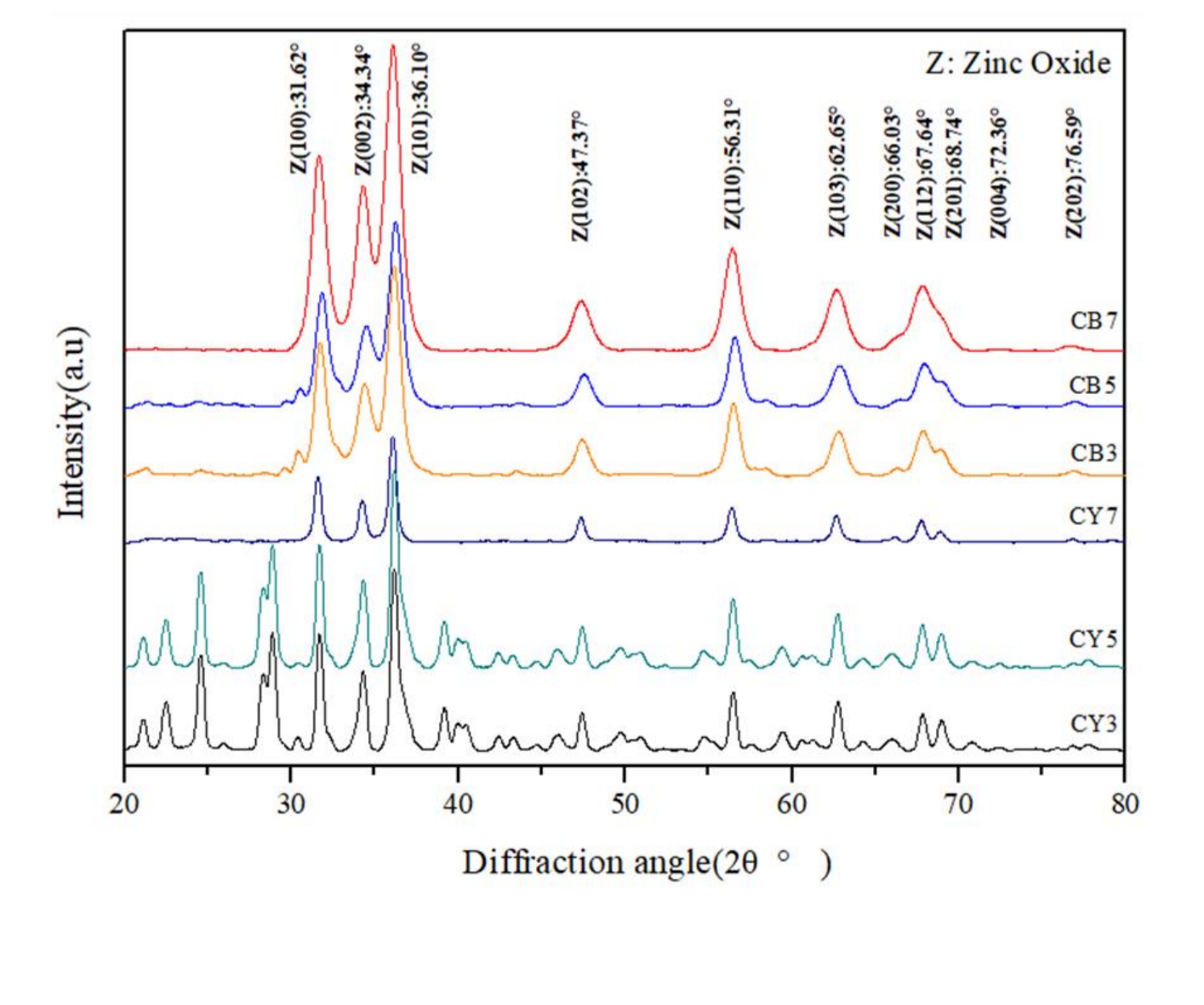
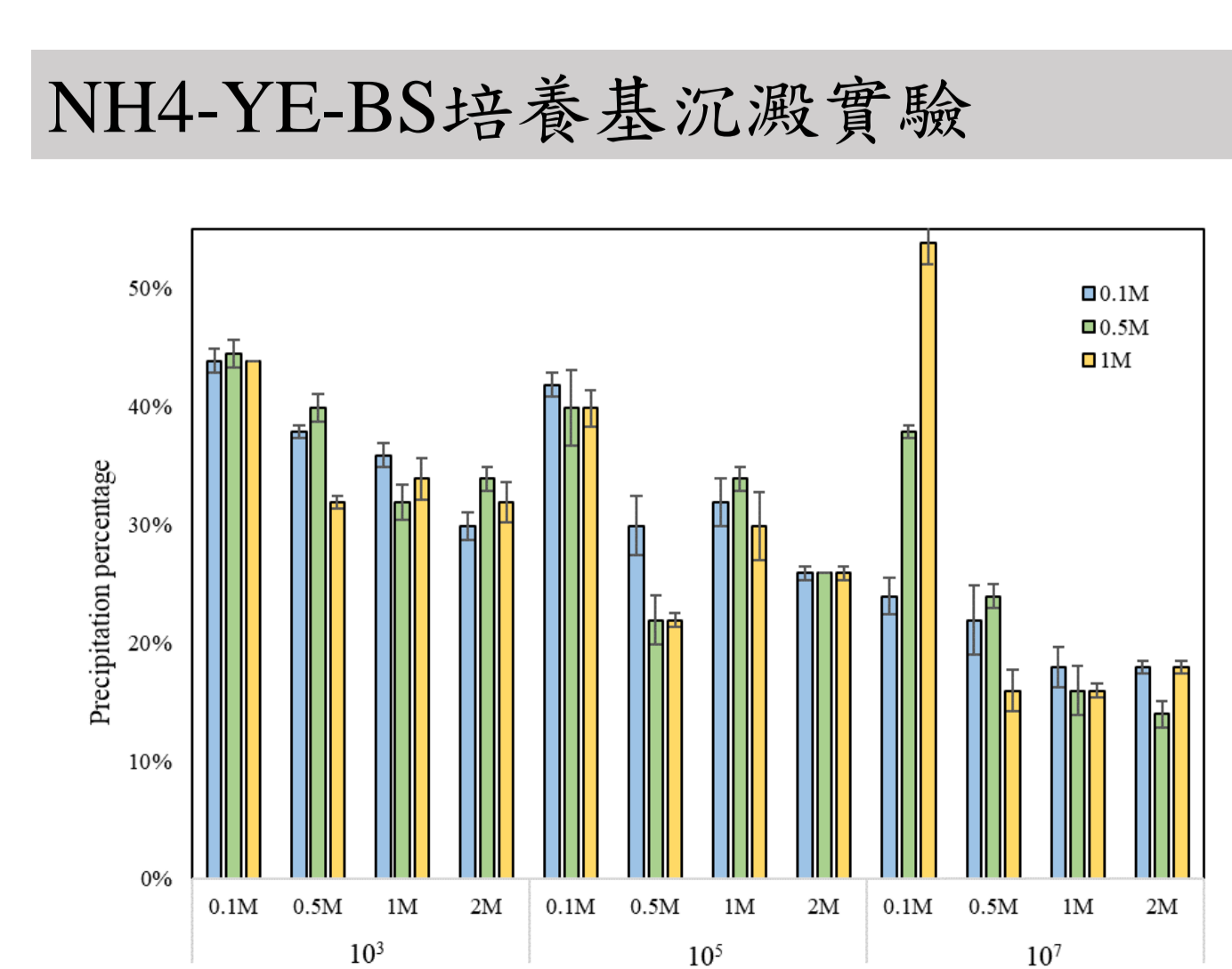
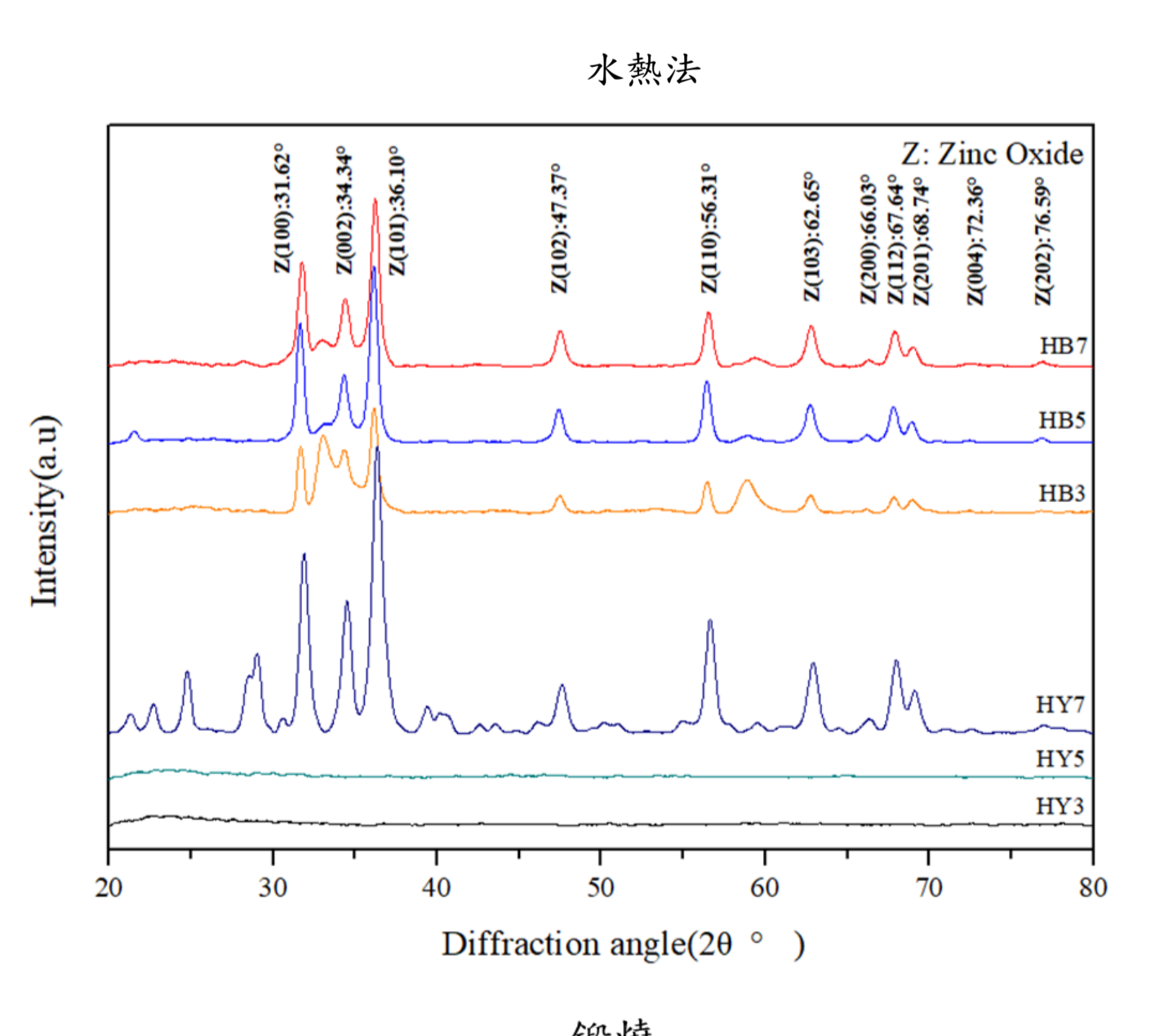
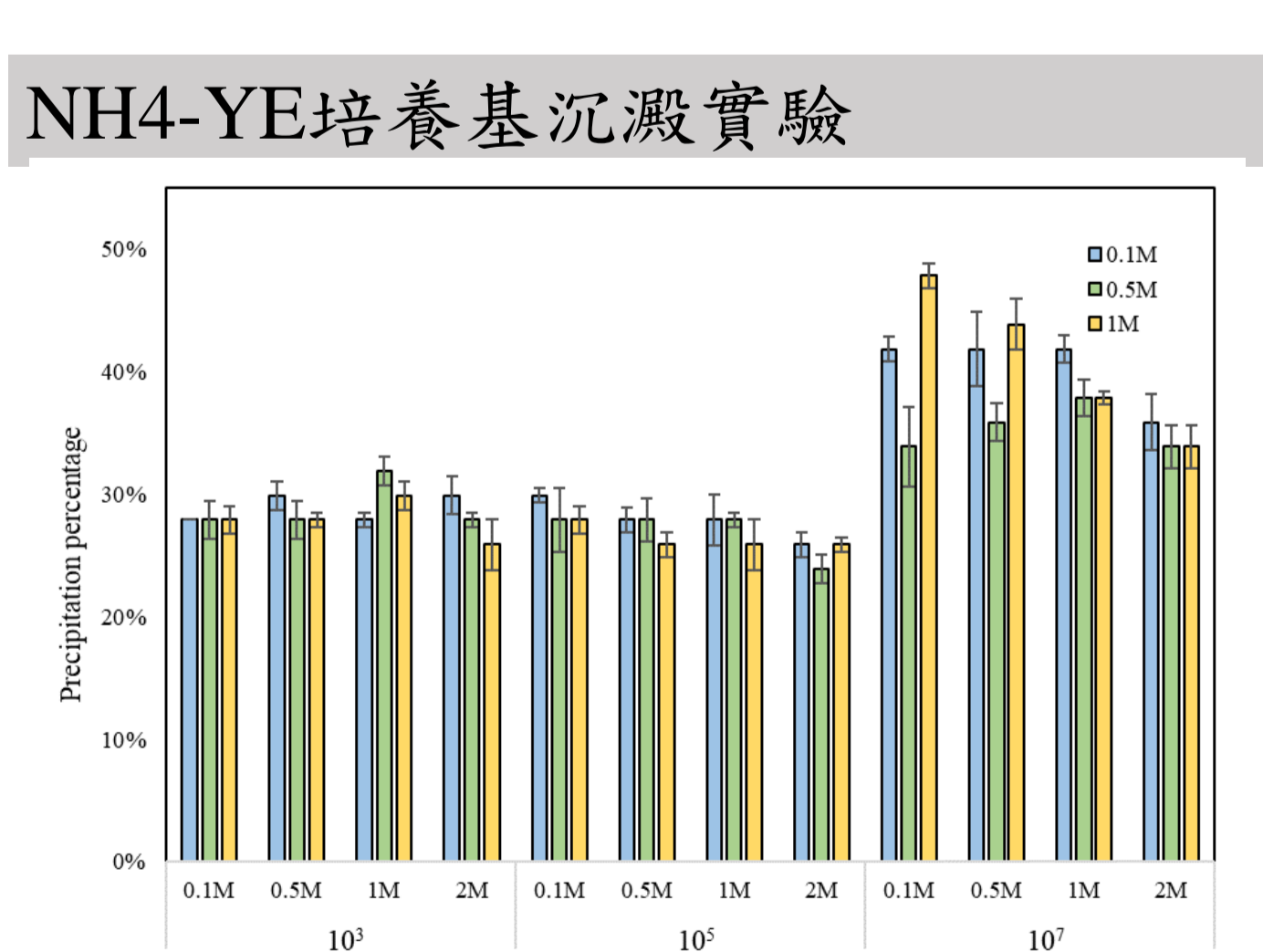
2022.12 - 2023.02: SUPER LAB testing (H1N1, SARS-CoV-2)

2023.02 - 2023.03: New company establishment

2023.03 - 2023.05: Patent application and publication

2023.05 - 2023.07: CCU and new company signing technology transfer agreement

二、主要執行成果



四、執行進度

工作項目	1st Year				2nd Year			
	8	11	2	5	8	11	2	5
專案圖說 (Sporosarcina pasteurii) 繪圖								
MIP 沉澱試驗								
Sporosarcina pasteurii 菌量活性測試								
MIP 技術與混凝土結合								
水熱法與水蒸氣法								
奈米氧化鋅生物白水泥混凝土物理特性試驗								
奈米氧化鋅生物白水泥混凝土化學特性試驗								
奈米氧化鋅生物白水泥混凝土光催化試驗								
抗菌特性試驗								
疏水性試驗								
數據分析及撰寫報告								
申請專利與論文發表								

五、研究團隊

聯合新聞網, yahoo! 新聞, 中央通訊社

99%封鎖細菌和病毒 中正理學院開發菌天花板將量產