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Effects of ultrasonic treatment on wet mineralization of cement powder

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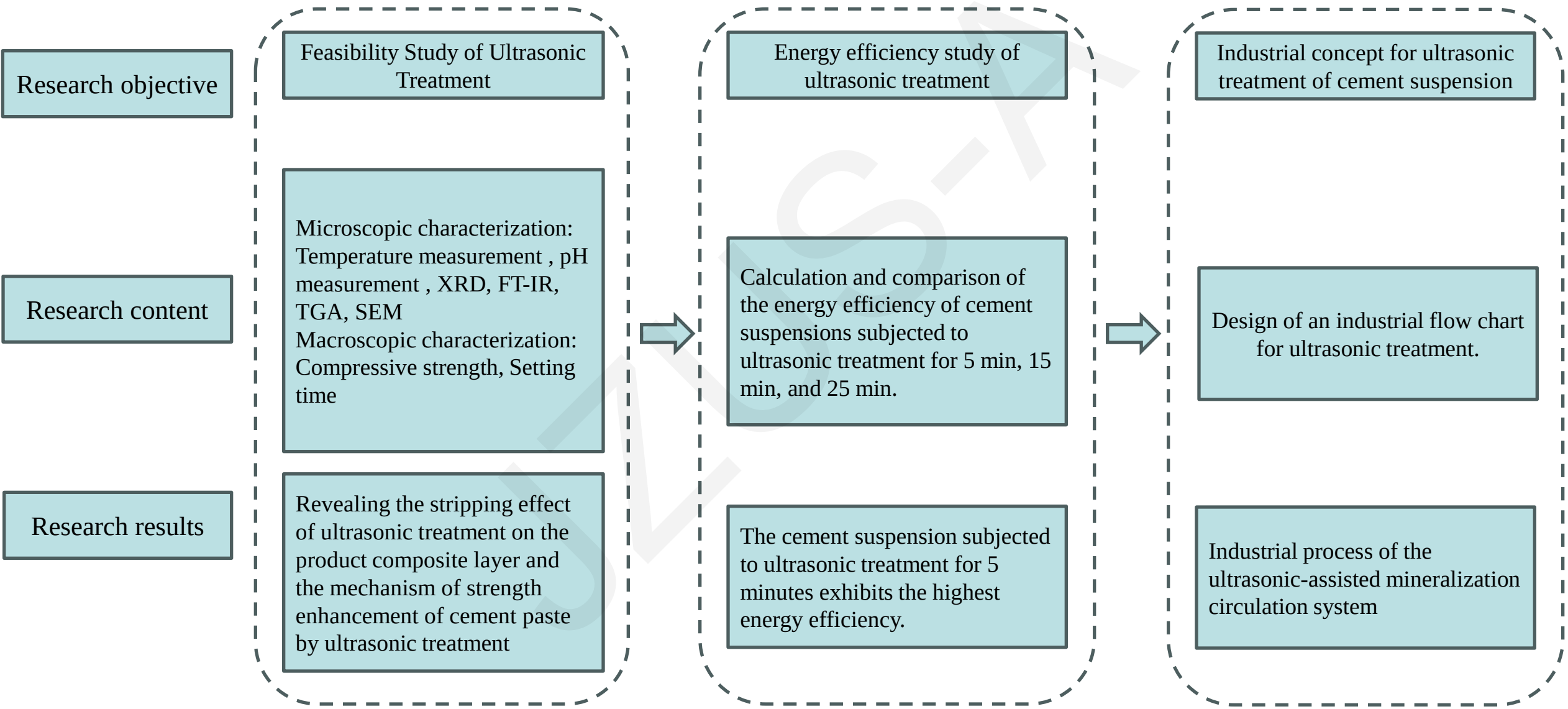
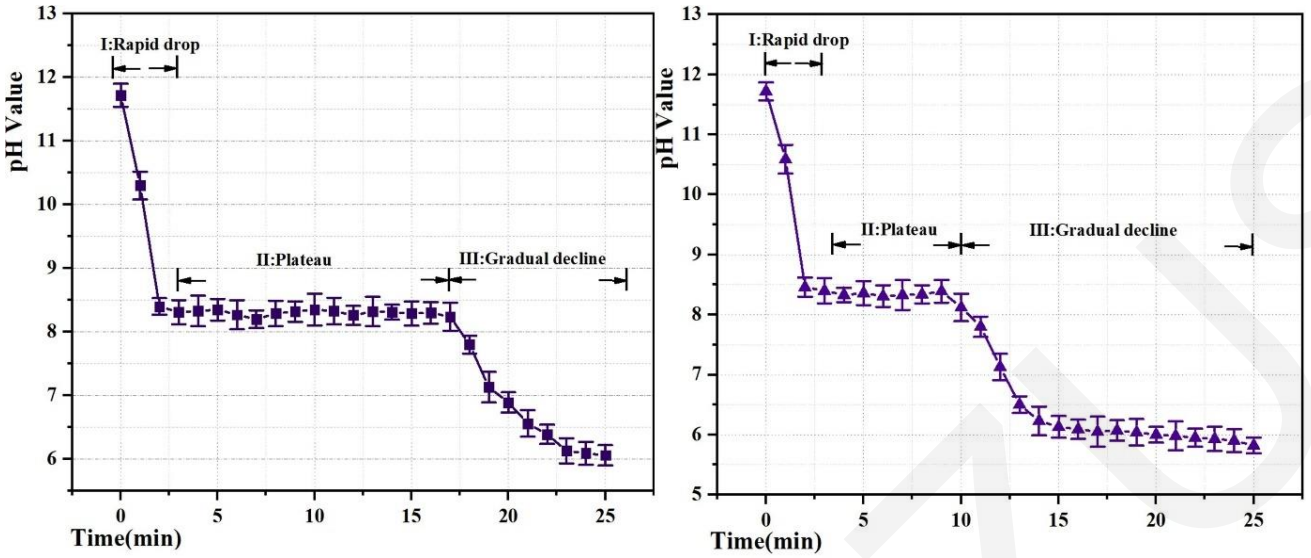
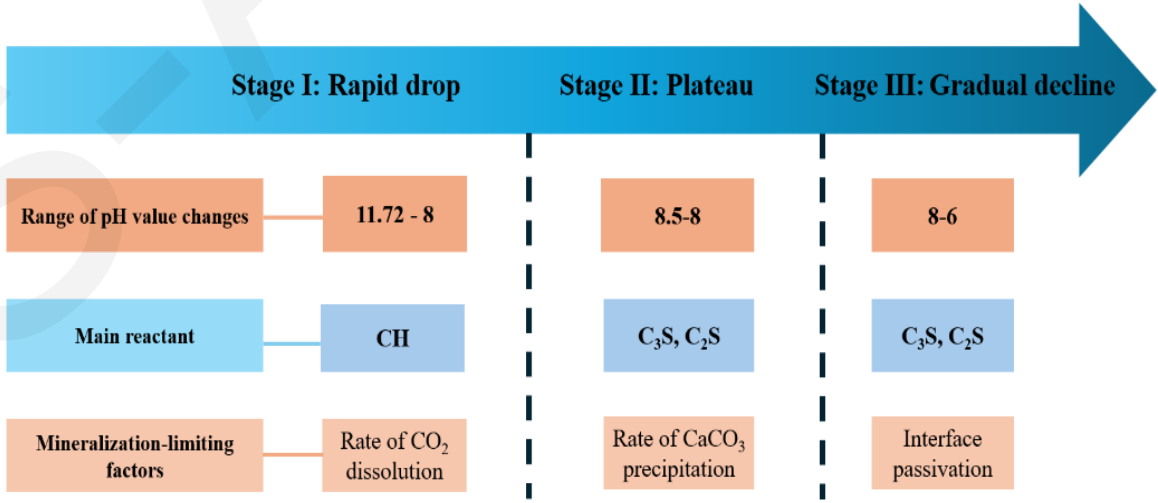
Innovation point and technical route



The pH variation process

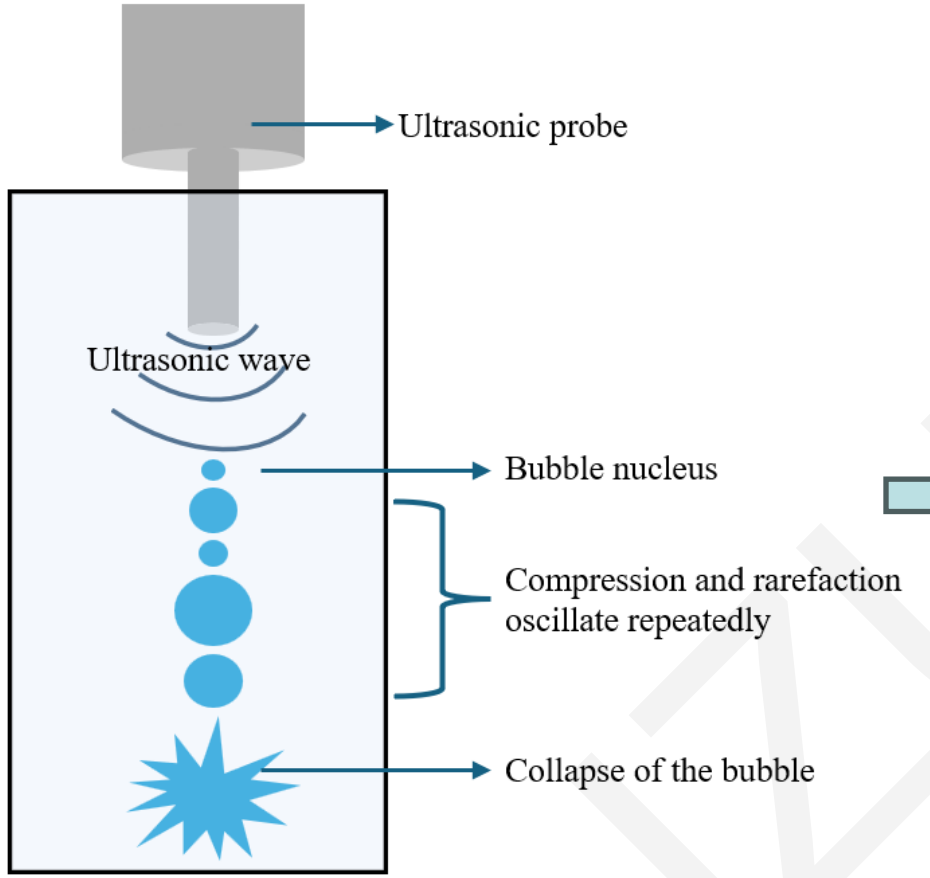


Comparison of pH changes of cement powder by ultrasonic-assisted and non-ultrasonic assisted wet mineralization, (A) ultrasonic-assisted, (B) non-ultrasonic assisted

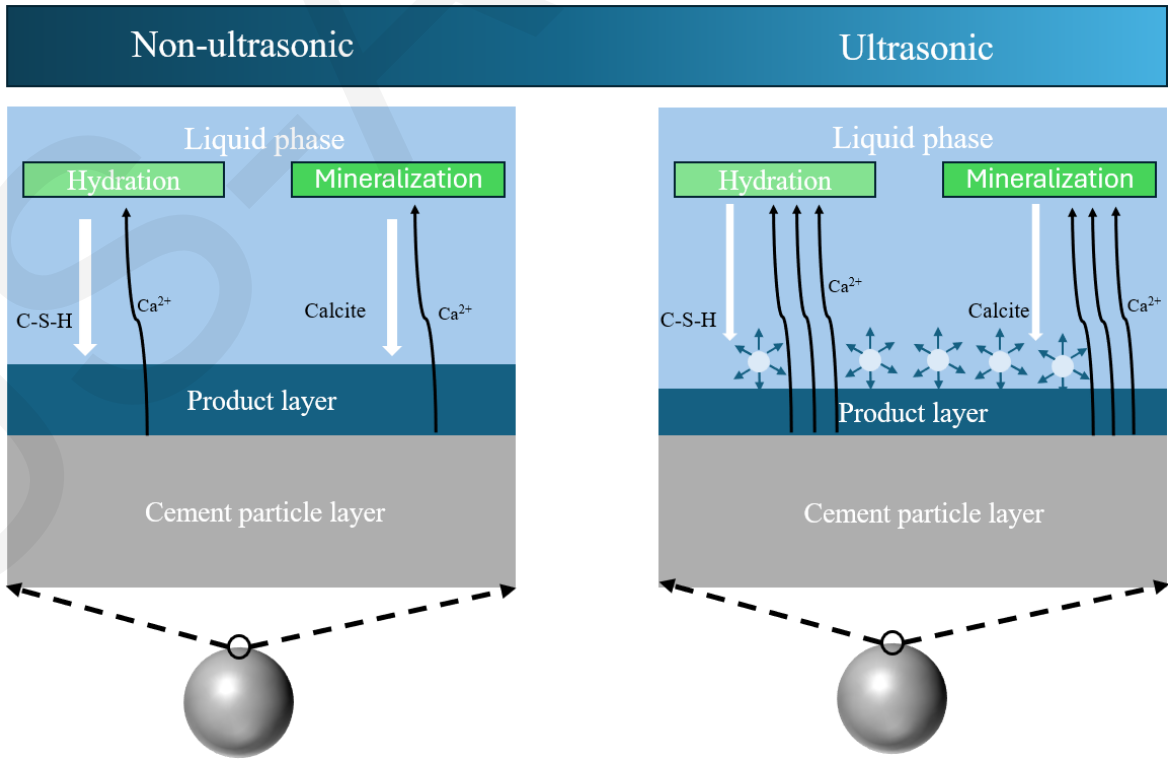


pH variation schematic

Mechanism of ultrasonic treatment

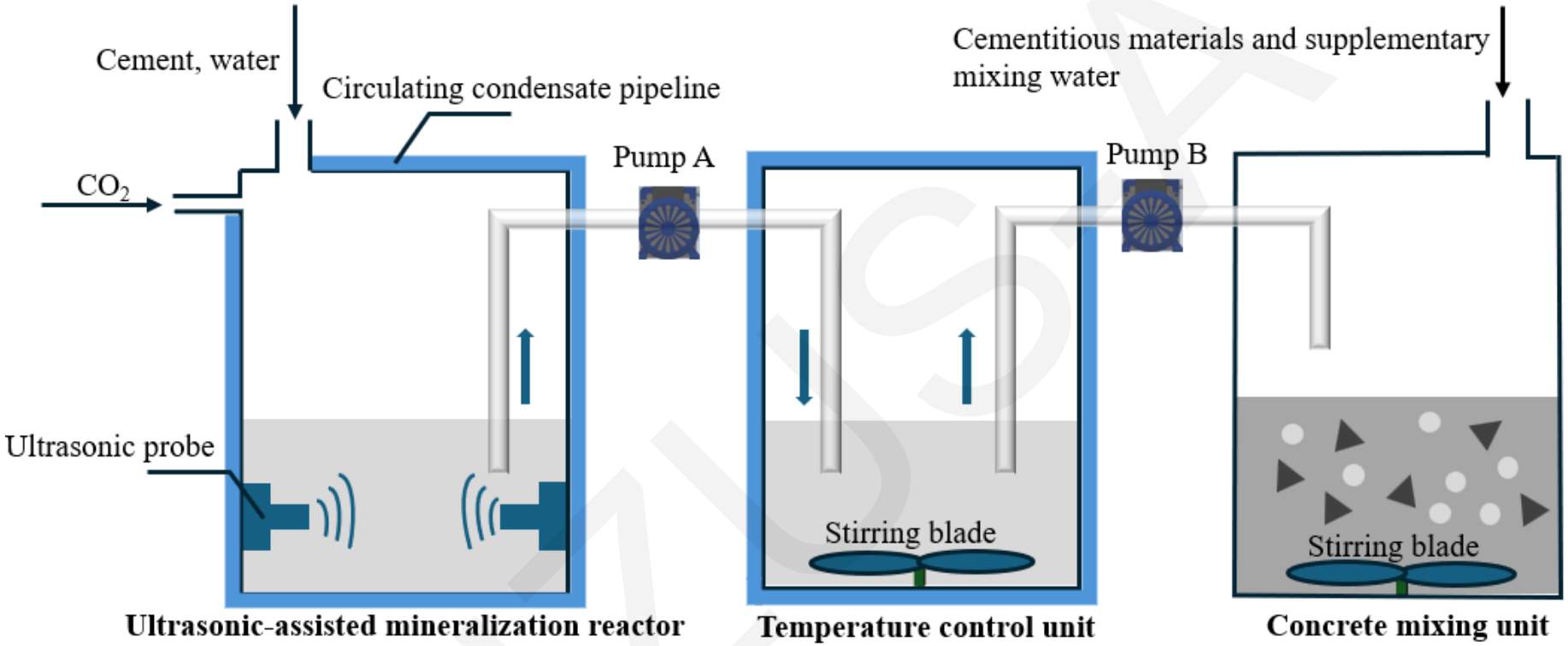


Formation process of cavitation bubbles under ultrasonic action



Stripping effect of ultrasonic treatment on the product composite layer

Industrial concept



Schematic diagram of the industrial process of the ultrasonic-assisted mineralization circulation system

Conclusions

- pH variation during the process followed three distinct stages: a rapid drop, a plateau, and a gradual decline.
- During the same wet mineralization period, the content of C-S-H in the ultrasonic-assisted cement suspension increased by 16.02%.
- Ultrasonic-assisted treatment improved the degree of mineralization and suppressed the growth of large crystals.
- The incorporation of wet mineralization-treated suspensions into cement pastes significantly increased the compressive strength and Shortened the setting time of the cementitious system