

# Influence of dry heating regime on the mechanical and shrinkage properties of reactive powder concrete

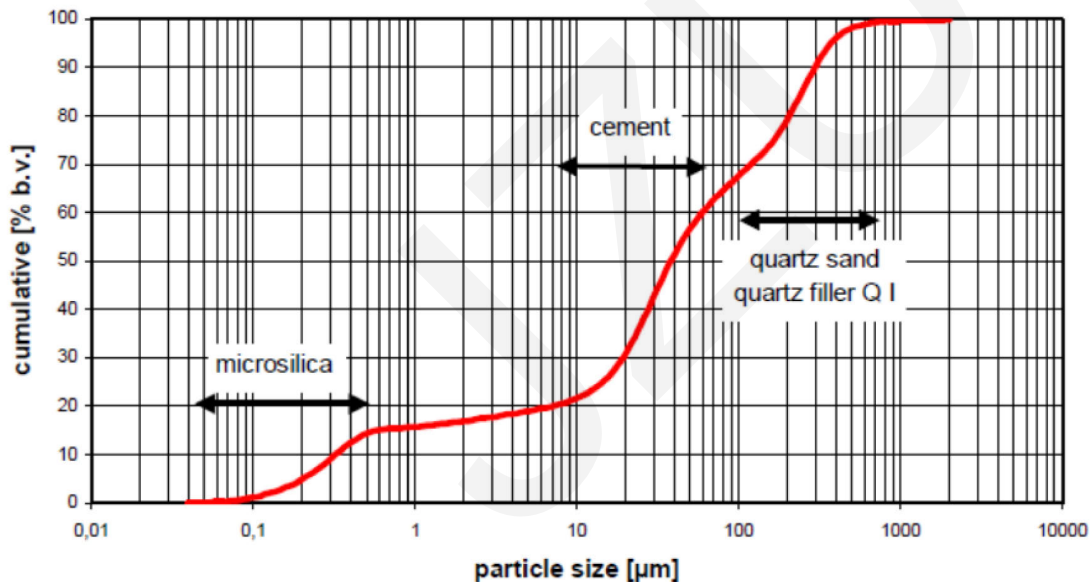
**Key words:** High temperature curing; Reactive powder concrete; Mechanical properties; Shrinkage

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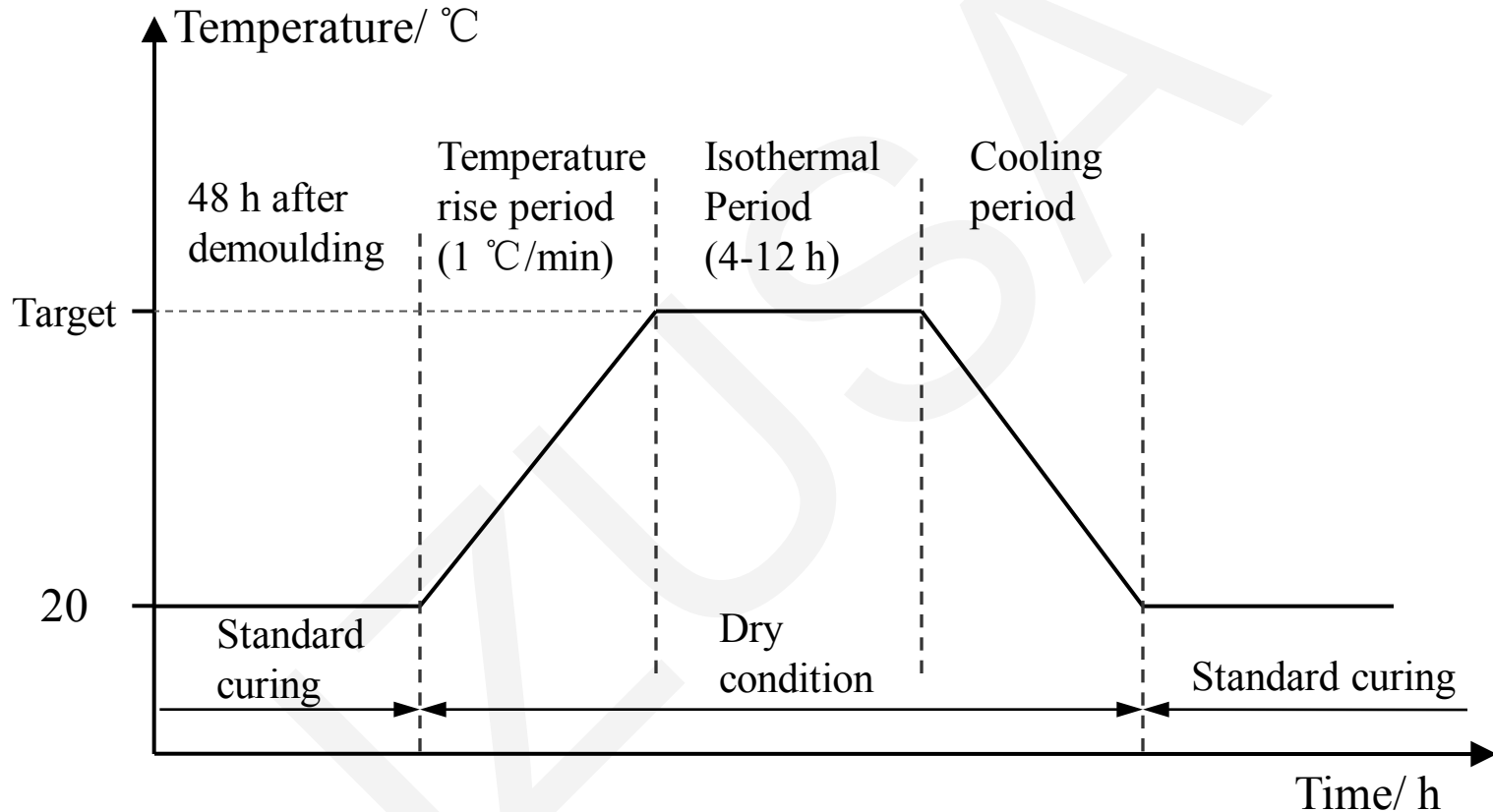
# Introduction

## RPC (Reactive Powder Concrete)

- **Particle size optimization** of all components: cement, SCM (silica fume) and fine sand
- Extremely **low W/C-ratio** ( $< 0.26$ ) using highly powerful admixtures
- **Self-compacting/levelling** characteristics (perfect filling of moulds)
- **Enhanced ductility** (post-cracking) through steel/synthetic fibers



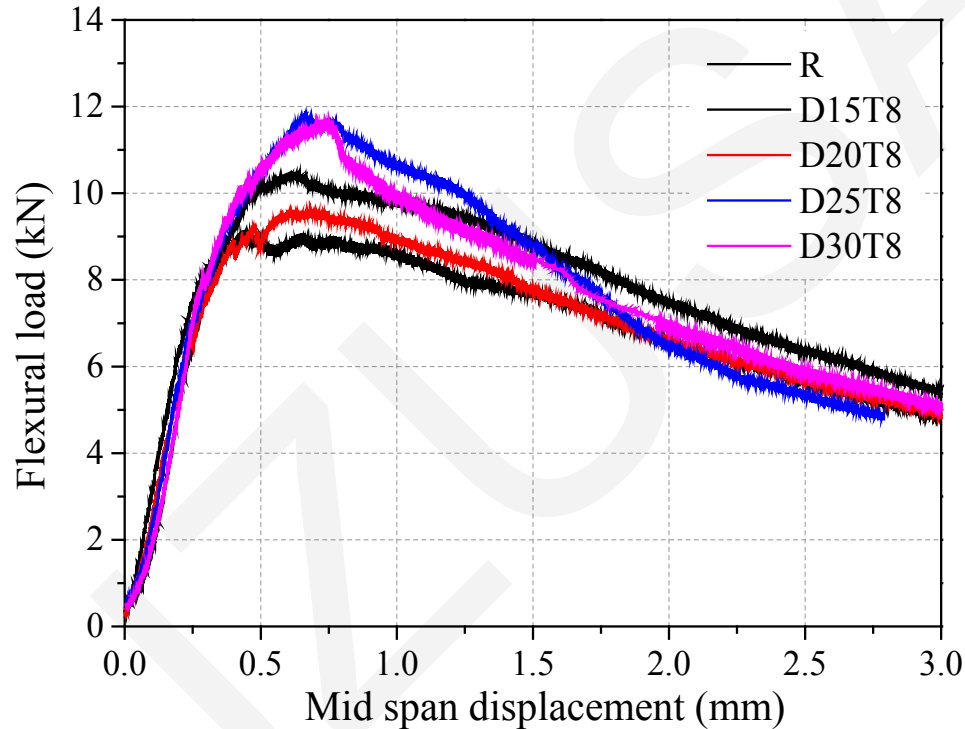
# Method



**Fig. 1. The specimens were then put in the heat-curing equipment for 4, 8, and 12 h, during which time the curing temperature was maintained at 150 °C, 200 °C, 250 °C, and 300 °C.**

# Results

## ■ Mechanical properties of RPC



**Fig. 2. The bending load–mid span displacement relationship of RPC mixtures at 7d.**

# Results

## ■ Microscopic enhancement mechanism

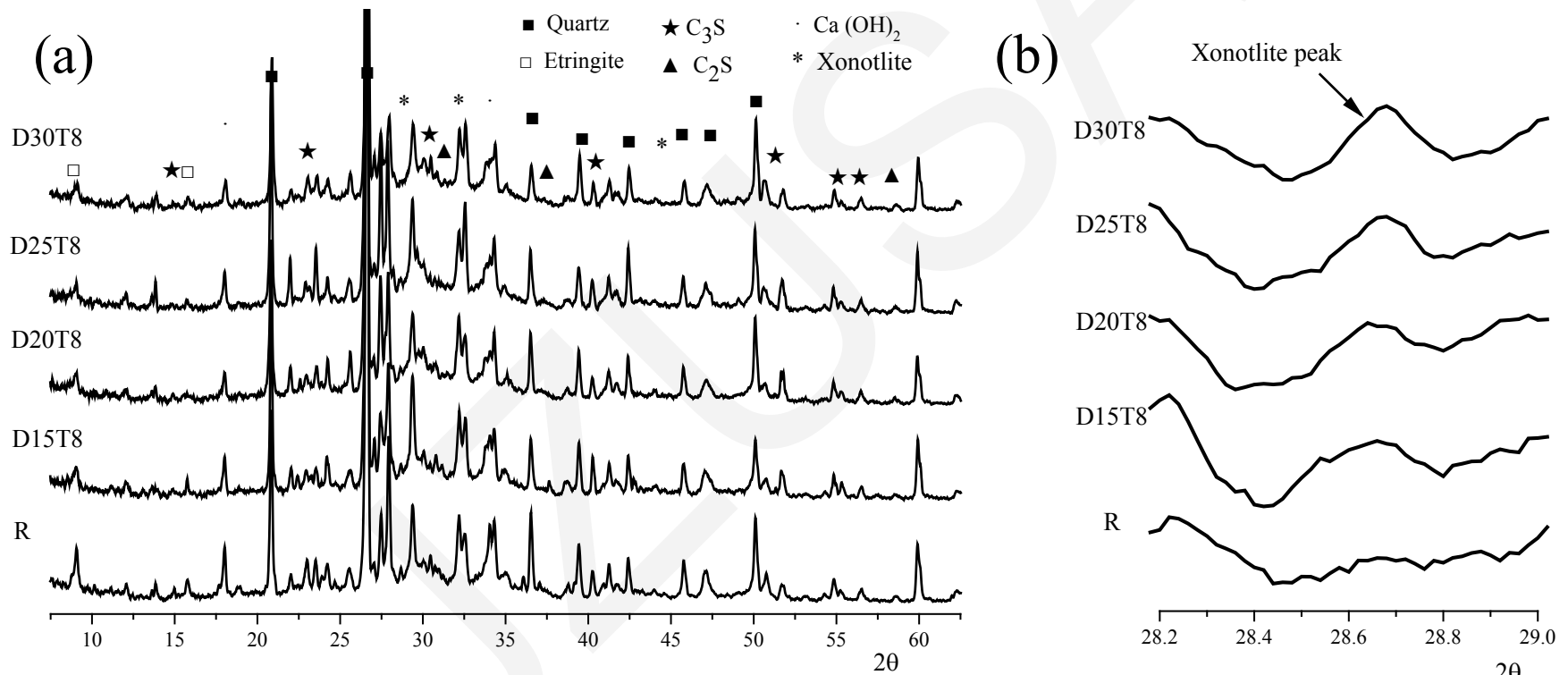


Fig. 3. XRD patterns of RPC at 7d

# Results

## ■ Drying shrinkage of RPC

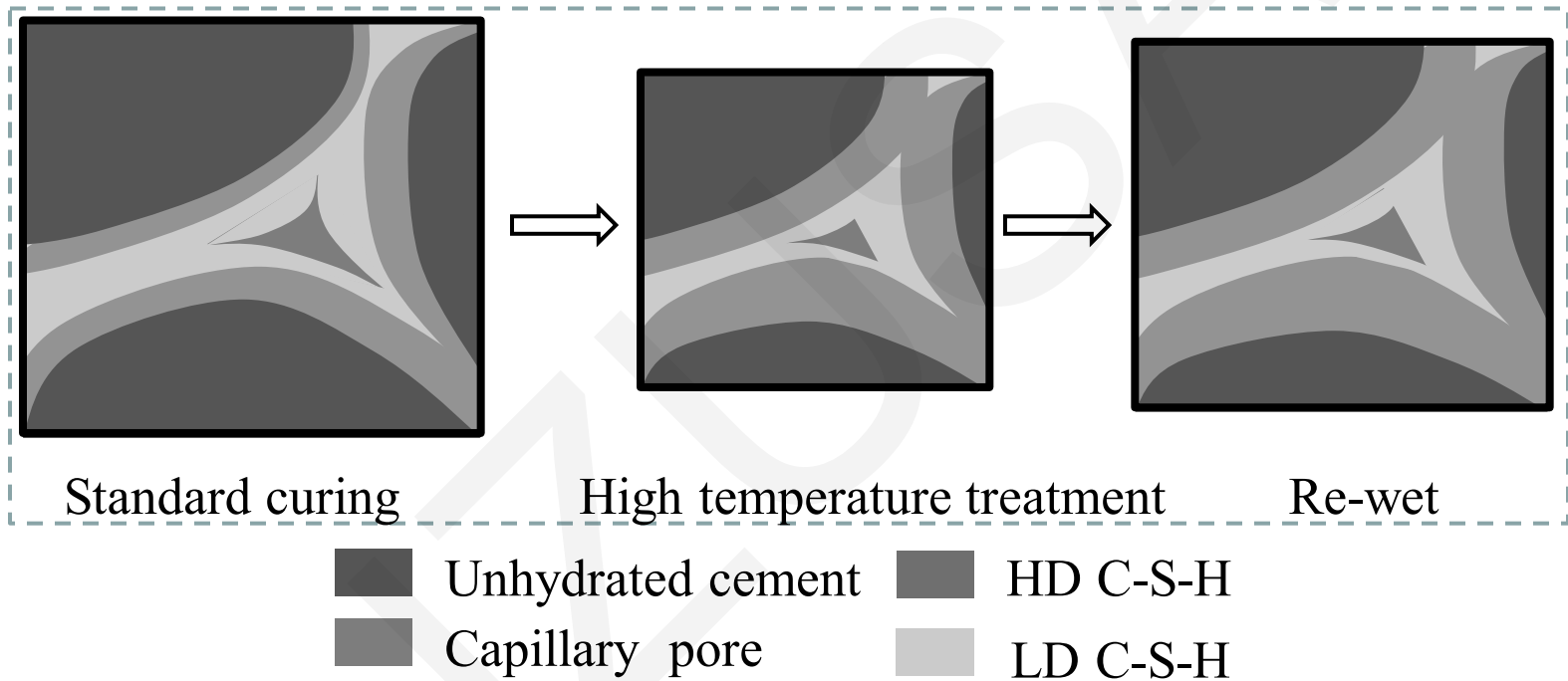


Fig. 4. Schematic diagram of the RPC matrix drying shrinkage with high-temperature curing.

# Conclusions

- Compared with the traditional curing method, the strength development of RPC at early age was significantly accelerated, and the 7d compressive and flexural strengths of RPC could exceed 170 and 35 MPa, respectively.
- The ultimate drying shrinkage of specimens was effectively reduced under low RH conditions.
- High-temperature curing improves the micro-scopic pore structure of RPC, thereby making the interfacial transition zone denser.