Raw material preparation in geopolymer production with special regards to the grinding

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Content

• Connection between the geopolymer and grinding

• Grinding equipments in the raw material preparation for geopolymer production
Grinding – Geopolymer

- Raw material of geopolymer: granular material with fine particle size

- Properties of the granular material:
  - Dispersity
    - Particle size distribution
    - Particle shape and morphology
    - Interfacial properties
Grinding – Geopolymer

- Properties of the granular material
  - Structural properties
    - Crystal structure
    - Amorosity
    - Mechanochemical activity

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Main questions

- What are the best ground material properties (dispersity and structural) for the geopolymer production?

- What is the most appropriate grinding equipment and which grinding parameters are suitable to reach the appropriate dispersity status and structural properties?
Grinding equipments for raw material preparation

- Vertical roller mill

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Grinding equipments for raw material preparation

- Traditional ball mill

  - Main operation parameters:
    - Ball filling ratio
    - Material filling ratio
    - Critical revolution ratio
    - Ball diameter and density
    - Grinding time

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Grinding equipments for raw material preparation

- Vibration mill

Main operation parameters:

- Grinding media filling ratio
- Material filling ratio
- Amplitude and frequency of vibration
- Grinding media diameter and density
- Grinding time

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Grinding equipments for raw material preparation

• Stirred media mill

Main operation parameters:

- Grinding media filling ratio
- Material filling ratio
- Circumferential speed of the stirrers
- Grinding media diameter and density
- Grinding time

Effect of grinding time – kinetics of the grinding process

• Section „a” - the specific surface area rises linearly with the grinding time (Rittinger section)

• Section „b” - the slope of the specific surface area decreases (section of aggregation)

• Section „c” - the specific surface area decreases with the grinding time, which can be explained by agglomeration.

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Thank you for your attention!