



ESCOLA POLITÉCNICA DA UNIVERSIDADE DE SÃO PAULO

- PQI 3203 Fenômenos de Transporte I

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ESCOLA POLITÉCNICA DA UNIVERSIDADE DE SÃO PAULO

Aula 14 - Introdução

PQI 3203 Fenômenos de Transporte

Planejamento

1. Introdução
2. Partículas
 1. Caracterização
 2. Cálculos
3. Leitos
 1. Caracterização
 2. Cálculos
4. Conclusão

1. Sólidos – aplicações

- Partículas x sistemas
- Caracterização de uma partícula x o todo



Figure 4-2. Large gravel piles at rock and stone facility near Marblehead, Ohio.

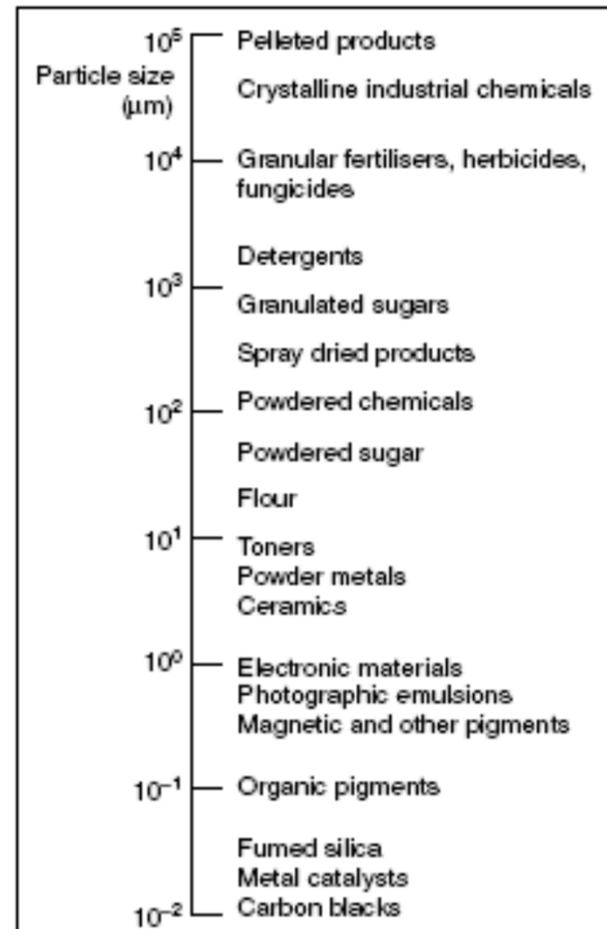


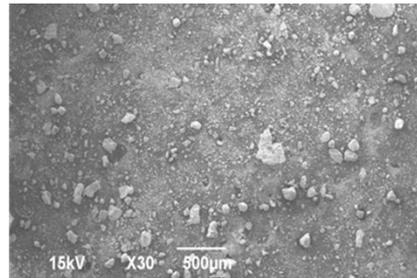
Figure 1.2. Sizes of typical powder products⁽¹⁾

2. Caracterização de uma partícula

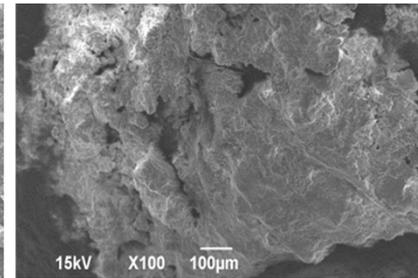
Composição

Tamanho

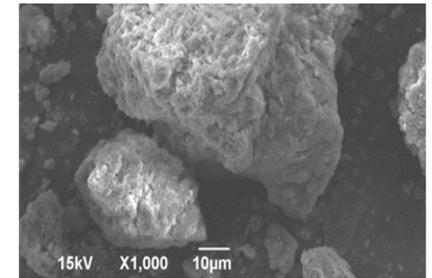
forma



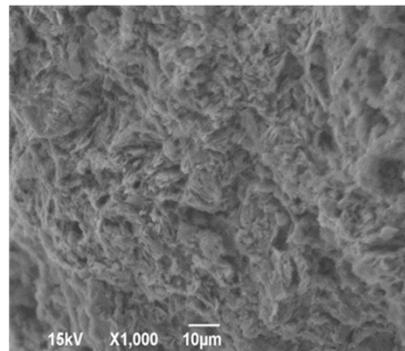
Areia fina - alóctone



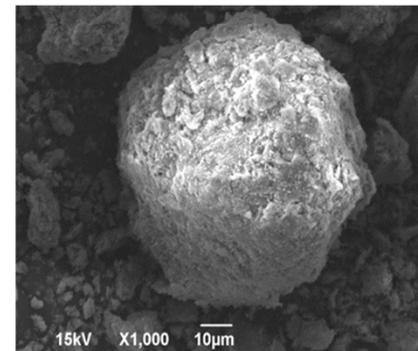
Silte - arranjo couve-flor



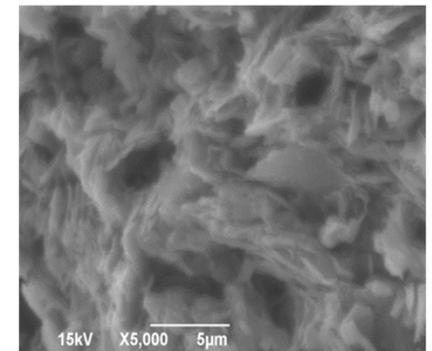
Silte/argila - micro-agregação



Silte/argila - estrutura amorfa



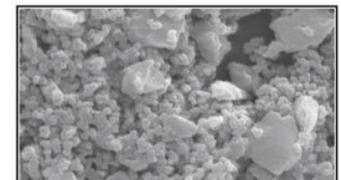
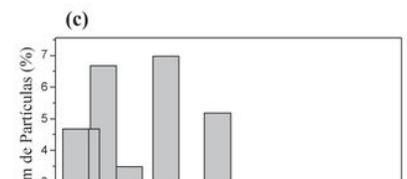
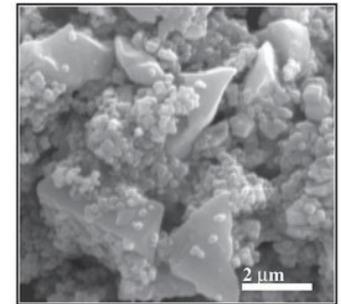
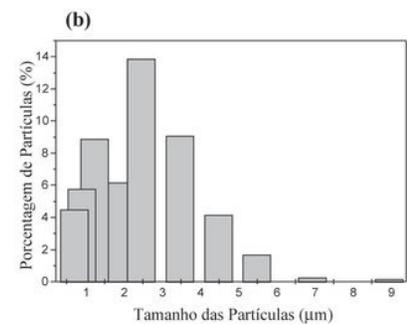
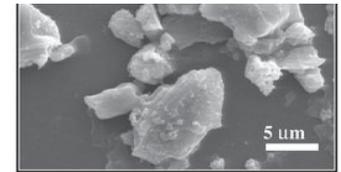
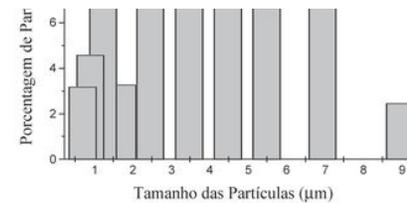
Silte/argila - estrutura fantasma



Argila - amorfo (quântica)

2. Caracterização de uma partícula

- Tamanho
- Dimensão característica
- Distribuições

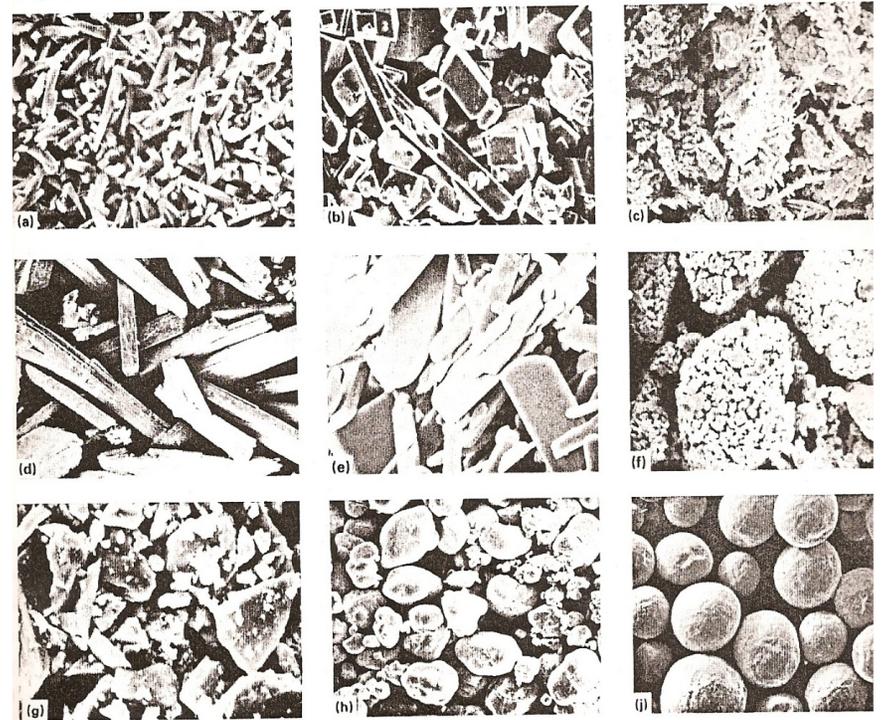


2. Caracterização de uma partícula

- Forma

Fig. 2 Common particle shapes as depicted in ISO 3252

a) Acicular powder particles. (b) Angular powder particles. (c) Dendritic powder particles. (d) Fibrous powder particles. (e) Flaky powder particles. (f) Granular powder particles. (g) Irregular powder particles. (h) Nodular powder particles. (i) Spheroidal powder particles



3. Sistemas particulados

- Todo
- Ângulo de repouso
- Porosidade
- Densidade aparente
- Viscosidade
- Permeabilidade

4 Conclusões

- Sistemas particulados: multifásico
- Novas propriedades fluidodinâmicas
- Sólidos \neq líquidos

Bibliografia

- ALLEN, T. **Particle size measurement**. Springer, 2013.
- MUNSON, B. R. et al. **Fundamentals of Fluid Mechanics**, 6a edição John Wiley & Sons, 2009.
- JM Coulson, JF Richardson, JR Backhurst, JH Harker, **Chemical Engineering: Vol. 2. Particle Technology and Separation Processes**, 6th ed., Butterworth-Heinemann, 2019.