Aging of a sintered friction material - Evolution of its microstructure and friction performances

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**Context**

- As-sintered friction material
- 1-4 year use on trains
- Friction material aged on train

**Sampling for material analysis**

- Weathering in laboratory tribometer

**Method**

- Tribological behaviour of train materials

**Lab Weathering**

- **Samples**
  - 3 cylindrical pads for material characterization
  - 2 rectangular pads for tribological testing

- **Conditions**
  - 1 week exposure to:
    - friction sequence based on field data under 95% relative humidity

**Characterization of train and lab-weathered materials**

**Characteized Materials**

- As-New (AN)
- Weathered with Friction (WF)
- Aged on Train (Train)
- After Friction Testing (+FT)

**Tribology**

- Average deviation of CoF (%)

**Porosity**

- Apparent density \( \delta_a (g.cm^{-3}) \)
- Open porosity \( \Phi_o (\%vol) \)
- Permeability \( k \ (m^2) \)

**SEM - EDX**

- Average Composition of Dioxides (at%) As-sintered (5 Oxydes)

**Brinell Hardness**

- Average hardness of friction surface (HB)

**Weathering Effects**

- Reduced CoF, especially at higher speeds
- Reduced open porosity and permeability
- Oxide development in pores
- Hardened friction surface

**Conclusions & Outlooks**

- Validation of the weathering test and material characterization
- Highlight of the CoF and material evolution during weathering
- Research now focused on the link between material and CoF evolution