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INSTITUT FÜR
KERAMIK, GLAS- UND BAUSTOFFTECHNIK



Potassium aluminates as refractories

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Motivation

- in the last years intensified use of secondary fuels
- problem: entering of secondary products (alkalies)
- reaction of the alkalies with the refractory
- the developed material has a reduced density, which leads to volume expansion



preterm destruction of the furnace lining

HENCE: Development of a furnace lining based on potassium aluminate



First part of the thesis

- Analysis of the synthesis of the potassium aluminates
- Synthesis of the potassium aluminates at different temperatures (900 °C, 1300 °C, 1600 °C)
- Synthesis is possible, but often heterogeneous powders generated



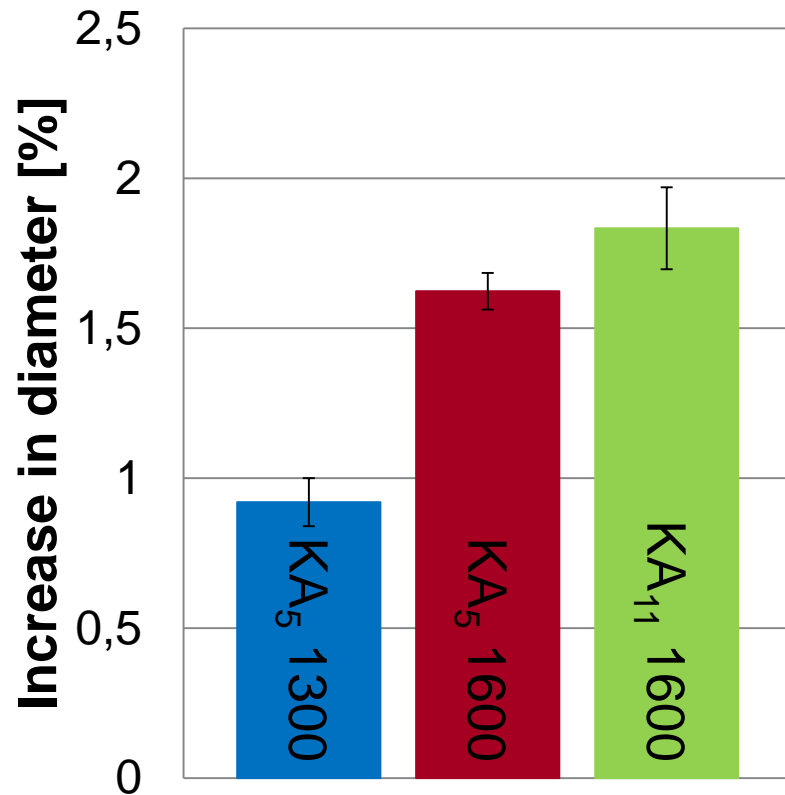
Second part of the thesis

- Development of a refractory based on the synthesized potassium aluminates
- As binder CA-14 W (ALMATIS) was used

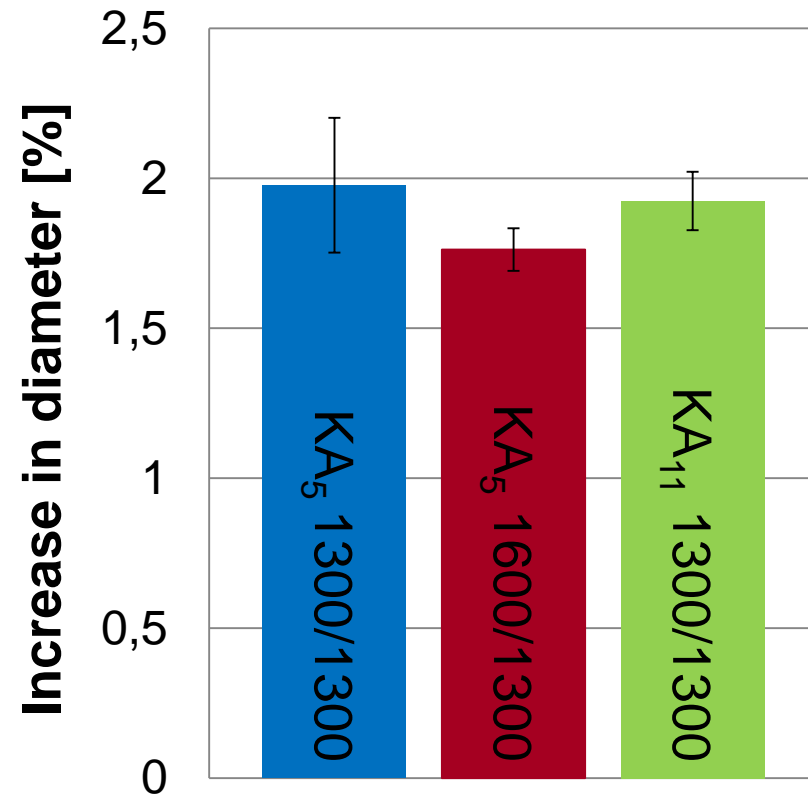


Alkali corrosion resistance

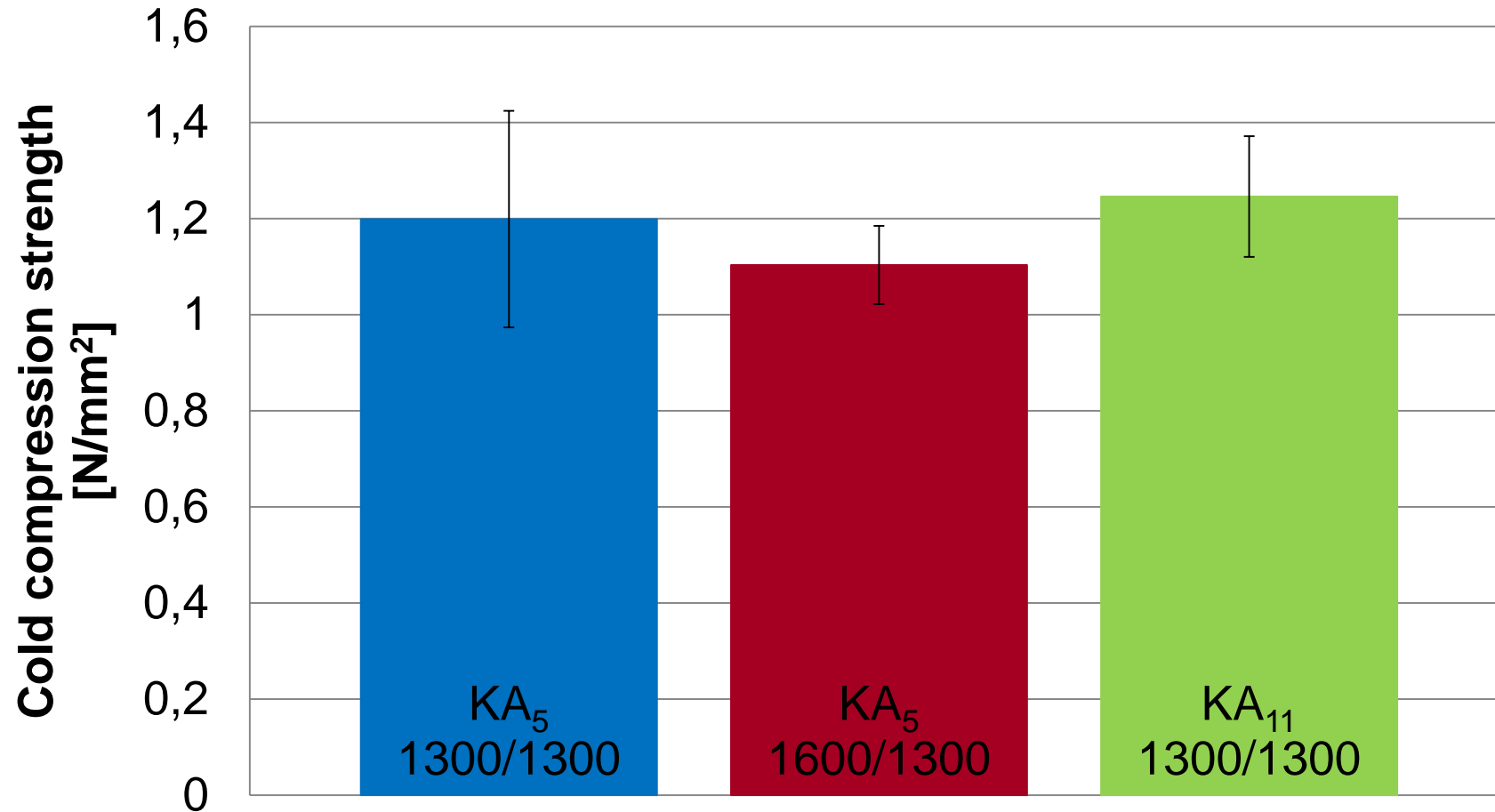
Synthesized potassium aluminate



Synthesized refractory castables



Cold compression strength



Most important findings

- successful synthesis of the potassium aluminates at 900 °C till 1600 °C
- successful development of a refractory castable based on potassium aluminates with CA-14 W as binder
- very good results in refractoriness under load
- alkali corrosion resistance is guaranteed at the refractory castables and at the grain
- BUT: low cold compression strength caused by high porosity



THANK YOU !

