

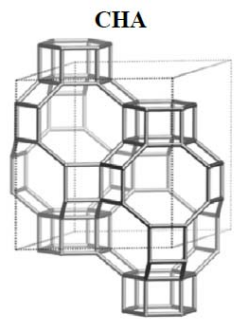
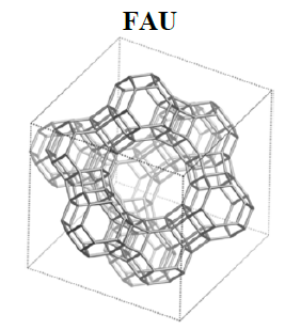
Patent Owner's Demonstratives

IPR2015-01121, -23, -24, -25
Umicore AG & CO. KG v. BASF Corporation
(Oral Hearing – July 28, 2016)

■ Metal-Exchanged Zeolite Catalysts

Zeolite Overview

- Crystalline framework materials that contain pores of a molecular size.
- Framework types are cataloged by the IZA.

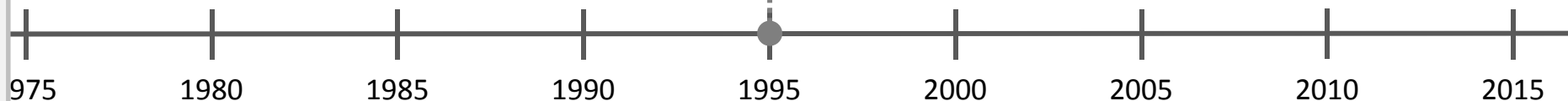
| Framework | Materials | Pore Size | Ring Structure |
|--|---|---------------|----------------|
|  <p>CHA</p> | chabazite (natural) SSZ-13 SSZ-62 | 3.8 Angstroms | 8-ring |
|  <p>FAU</p> | faujasite (natural) zeolite-Y | 7.4 Angstroms | 12-ring |

Ex. 2018, ¶¶56-61

Zeolite SCR Catalysts: Pre-662 Patent

“Indeed, several unresolved problems limit the outlook for successful use of zeolites in automotive converters: (i) hydrothermal stability, (ii) sensitivity to poisoning....A low hydrothermal stability, in particular, is the more critical weakness of copper-containing zeolites.”

Ex. 2012.005 (1995)

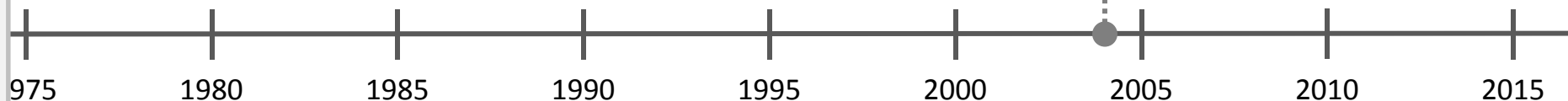


Zeolite SCR Catalysts: Pre-662 Patent

“The catalyst was tested for durability in both wet and sulphur containing gases, but even water had a negative long-term effect on the catalyst and its applicability must be regarded as rather low. **One can be quite pessimistic about the use of zeolites for several reasons:**

- (i) The catalyst types have been tested in the SCR reaction since the eighties without a commercial breakthrough.
- (ii) Zeolites have been extensively tested in the so-called HC-SCR reaction with insufficiently long-term stability....

Ex. 2026.006 (2004)



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