



Bretzfeld, 16.07.2018

Difference silica gel molecular sieve

Are there differences between silica gel and molecular sieve in the adsorber?

One experiment demonstrated the difference between silica gel orange-green and molecular sieves 4A and 13X when used in an adsorber. For the test, 0.5 kg each of the desiccant were tested at a mass flow of 46.6 g / h. This is calculated using a volume flow of 50 l / min, a temperature of 20 ° C and a relative humidity of 90%. Due to the lack of a moisture indicator, key figures for the color changes are determined for the molecular sieves.

The behavior of the breakthrough curve of molecular sieves differs from that of the silica gel. This has a value of approximately 0 for low loadings. Towards the maximum load, the breakthrough curve of the molecular sieves increases steeply up to the value 1. The steeper rise of the breakthrough curve suggests a more complete loading of the molecular sieve. The maximum loading of the molecular sieves is lower than that of the silica gel and is reached faster due to the steeper breakthrough curve. The maximum loading of the molecular sieve 13X is above that of the molecular sieve 4A. Due to the shallower breakthrough curve, the water content at low loadings is lower than that of the silica gel. Only when reaching the maximum load, the water absorption increases steeply, since from this point no more water is absorbed.

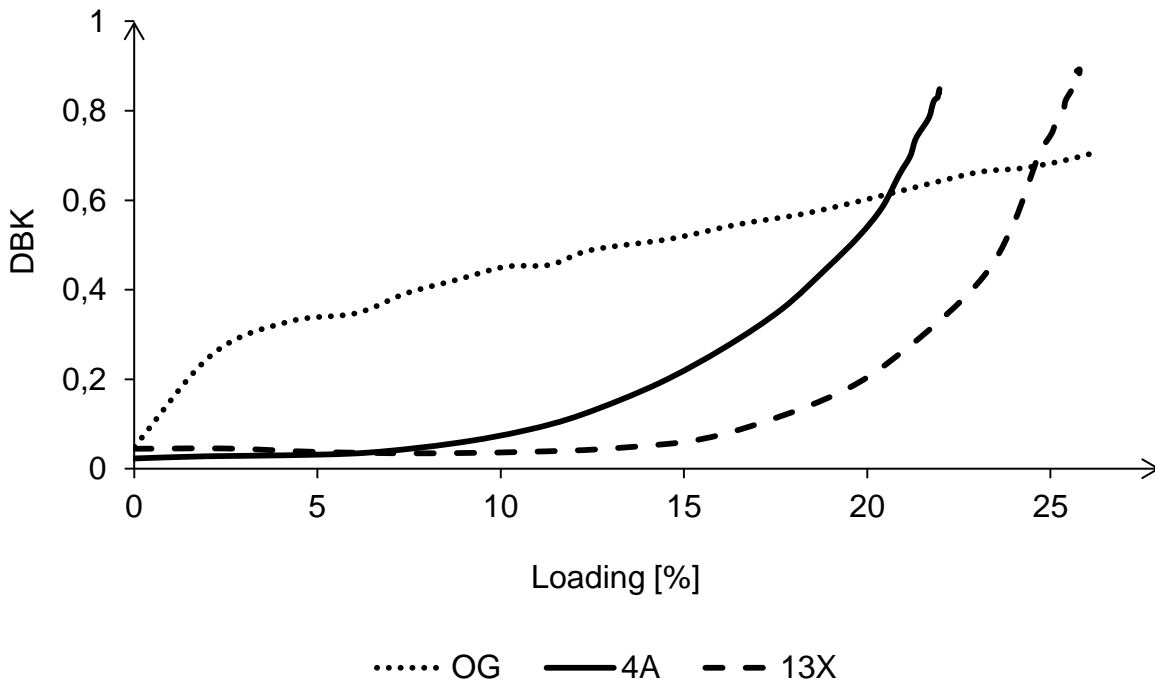


Figure: Dependence of the DBK on the load for different adsorbents.

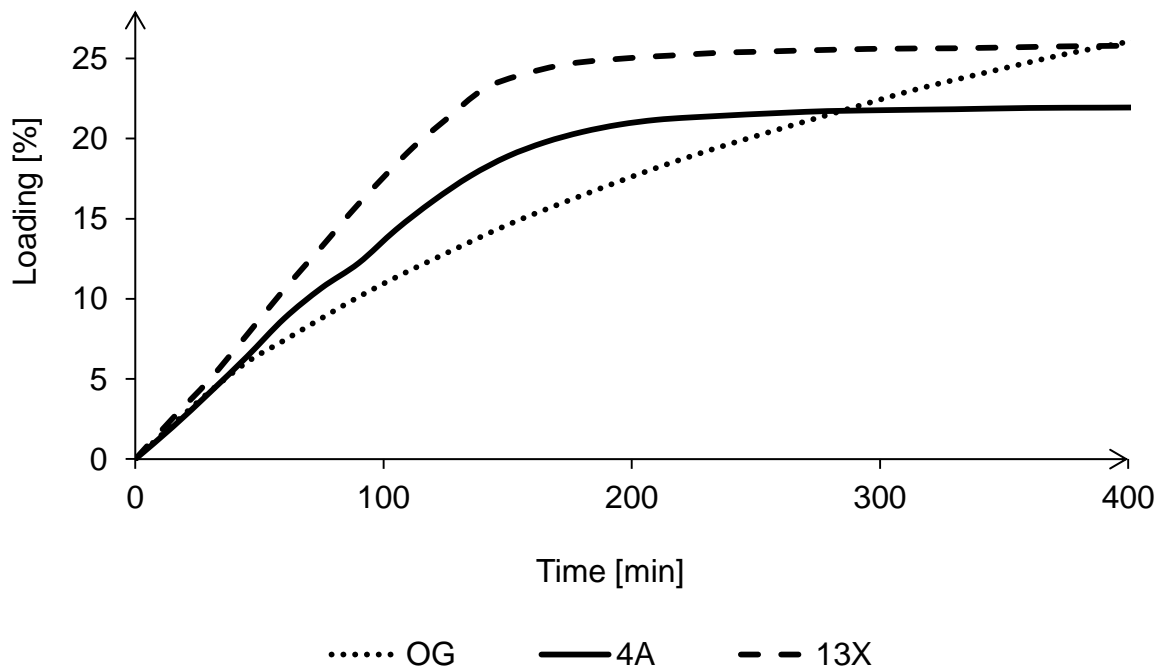


Figure: Dependence of DBK on time for different adsorbents.

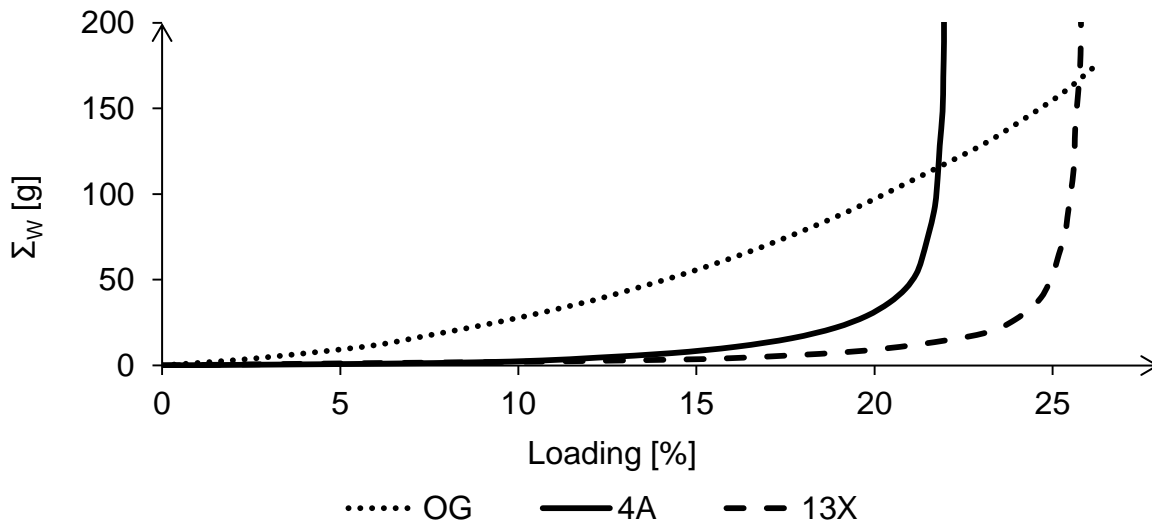


Figure: Dependence of the water sum on the load for different adsorbents.

Result

Through the use of molecular sieves, especially the MS 13X, the system to be ventilated is better protected. Due to the strong binding of water, the entire incoming air humidity is adsorbed. The molecular sieve **13X has a higher maximum** loading than the molecular sieve 4A. Both molecular sieves have lower adsorption properties **than the silica gels at low loading**, resulting in faster saturation. In addition, **the lack of color indicator** is disadvantageous for use in a ventilation dryer.