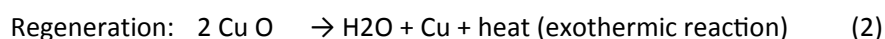
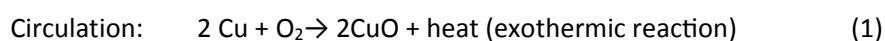


**MBRAUN Technical Note:
MAXIMUM OXYGEN CAPACITY OF COPPER CATALYST**

In the **MBRAUN** gas purification systems the oxygen is removed by a copper catalyst. The copper catalyst is used as a regenerable oxidizing material, which is not consumed.

The used copper catalyst is a finely dispersed activated/reduced copper oxide deposit on porous aluminium support. It consists of approximately 30% copper on the carrier material. During circulation the inert gas flows through the reactor column where copper reacts with the oxygen to copper oxide according to equation (1). During regeneration, the copper oxide is reduced to copper by means of hydrogen according to equation (2).



One kg of the copper catalyst can remove maximum 8 liter oxygen from the inert gas in case the whole surface of the copper catalyst reacts with oxygen. However, the reaction rate for oxygen removal decreases when the loading of the copper catalyst increases. The **reaction rate is proportional to the amount of free copper**. In reality, the **oxygen concentration increases because the reaction is slower than the rate of oxygen intake** (e.g. leaks or permeation).

Difference between maximum and useable oxygen capacity (for purity < 1ppm):

Industry always quotes the maximum oxygen capacity but it is an undeniable fact that for a useable oxygen purity < 1 ppm inside the glove box the loading capacity is less than the maximum capacity of the copper catalyst.

Because the reaction will be too slow to purify the inert gas in an acceptable time, the copper catalyst has to be regenerated. Therefore, the full loading of the copper catalyst cannot be used for a concentration < 1 ppm.

That means the useable oxygen capacity (for purity < 1 ppm) depends upon the desired operation conditions!