



ZEOCHEM®

Palladium Scavenging with ZEOprep® SH

Palladium



Figure 1: palladium acetate.

Transition metals like palladium (Pd) are frequently used as catalysts in the preparation of various pharmaceutical compounds. Without a specific removal process, traces of those metals can be present in the final product. This is undesired due to the high toxicity of the resulting metal complexes.

Palladium removal

Palladium can be removed for example by complexation with a scavenger. As scavenger a thiol derivatized silica gel can be employed. This has the advantage that so-called solid phase extraction processes can be utilized.

Experimental procedure

Palladium acetate has been removed with ZEOprep® 60 SH 40-63 µm.

Palladium acetate with a concentration of 10 mmol/L (1000 ppm) has been put in contact with one and four equivalents of scavenger (the SH group concentration on the silica gel is 1 mmol/g). Two temperatures have been investigated. At the end of the experiment the amount of Pd remaining in solution was determined by graphite furnace atomic absorption spectroscopy.

Results

The following pictures are showing the progressive Pd acetate removal by the scavenger material. After 48 hr (ex. 6), less than 1 ppm Pd remained in solution for the experiments with 4 equivalent scavenger at 25°C.

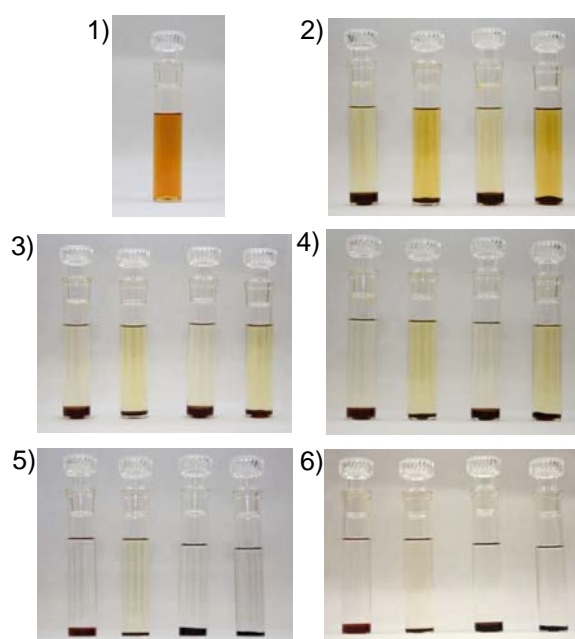


Figure 2: palladium acetate removal. 1) without scavenger; 2) start; 3) after 30 min; 4) after 1 hr; 5) after 24 hr and 6) after 48 hr. From left to right in pictures 2) to 6): 4 eq.* at 25°C; 1 eq.* at 25°C; 4 eq.* at 75°C and 1 eq.* at 75°C. *: of ZEOprep® SH scavenger.

Conclusions

Palladium can be effectively removed via complexation with the scavenger: ZEOprep® 60 SH 40-63 µm. The process is faster when using 4 equivalents of scavenger and at high temperature.