



Catalysts BY EVONIK

Handling Procedures for Activated Metal Catalysts (AMC)

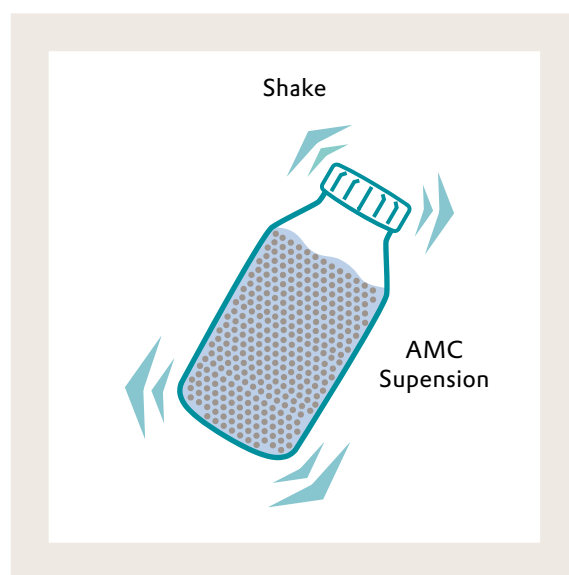
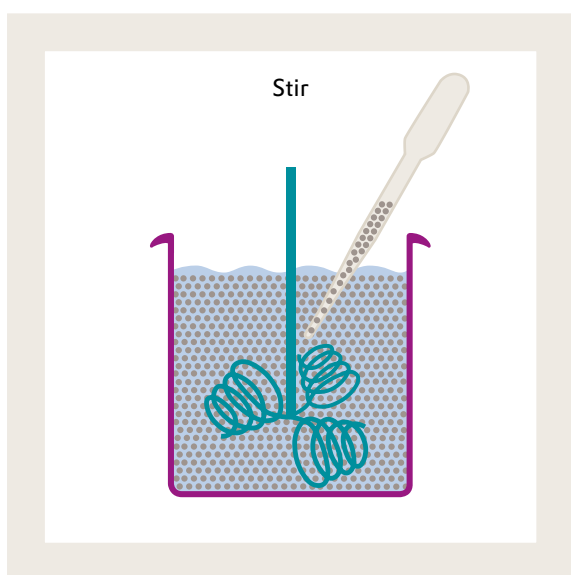
AMC Sampling and Weighing

General Sampling Procedure

The activity of an AMC catalysts is inversely proportional to its particle size. Hence it is very important to obtain a representative sample when weighing a small portion of catalyst for test reactions.

Prior to sampling remove the excess water. We recommend that the catalyst be stirred so a uniform suspension is formed. For sampling smaller catalyst amounts, it may be adequate to shake the bottle vigorously in order to produce the uniform catalyst suspension and to sample it immediately before the particles start to settle. The sample should be taken with a pipette from the middle of

this suspension. While the shaking method may be easier, one usually obtains better results with the stirring technique. The sampling method is even more important when it is needed to pull a representative sample from a drum of catalyst. In this case, we recommend the stirring method with the sample being obtained from the middle of the uniform stirred suspension.

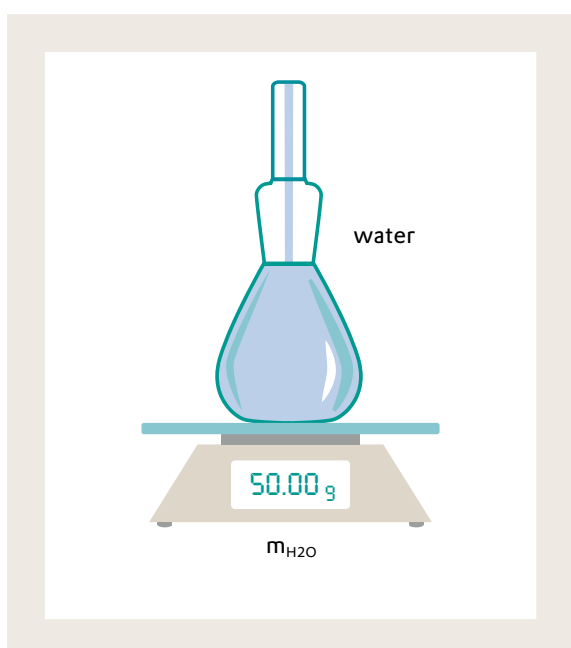


Lab scale weighing procedure for samples less than 10 grams

We recommend a simple method for the accurate weighing of AMC based on an experimentally determined linear correlation between the dry weight and the suspension density of the AMC.

Step 1

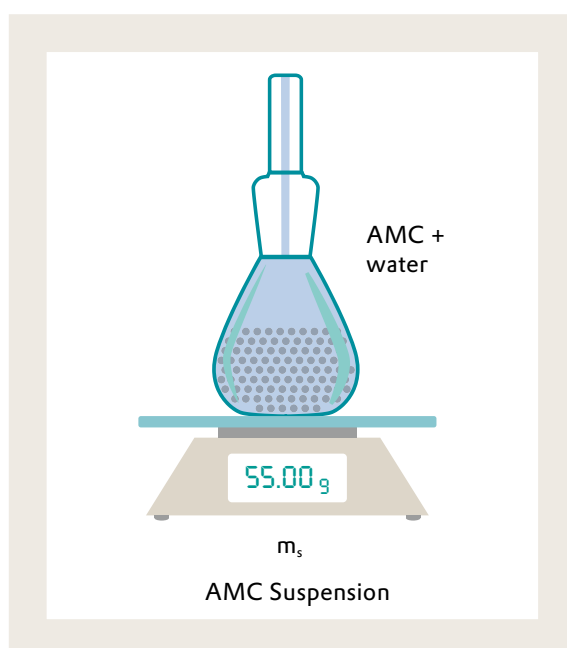
Please tare a pycnometer including stopper, remove stopper and overfill it with water, place the stopper in the pycnometer so that there are no bubbles in it, wipe off the excess water, weigh it, and record this weight as m_{H_2O} .



Step 1

Step 2

Remove the stopper, pour out the water, add the AMC suspension, add enough water to the pycnometer so that it overfills, place the stopper in the pycnometer without leaving bubbles, wipe off the excess water, weigh it, and record this weight as m_s . Calculate the dry mass of the catalyst (m_{Cat}) using equations 1 and 2.



Step 2

$$\text{Equation 1: } m_{Cat} = k * (m_s - m_{H_2O})$$

$$\text{Equation 2: } k = d / (d - 1)$$

Where:

m_{H_2O} = The weight of the container with the defined volume of water in g (grams).

m_s = The weight of the container with the defined volume of AMC suspension and water in g (grams).

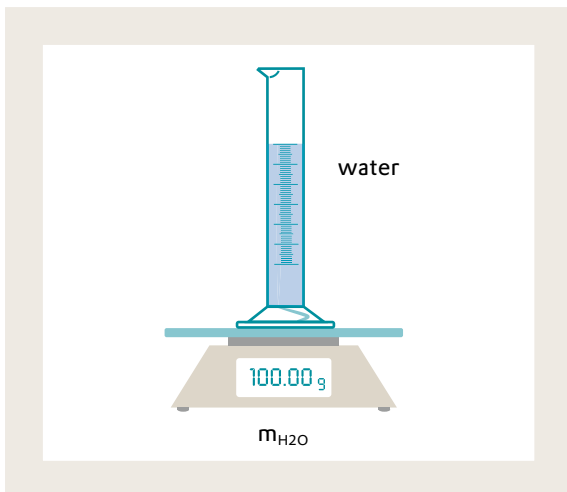
m_{Cat} = The calculated dry weight of the AMC in g (grams).

k = The skeletal density correction factor. This accounts for the volume of water displaced by the catalyst solids. k is calculated by equation 2 where d is the true catalyst density (g/cm^3). For activated nickel catalysts, k is equal to 1.167 and d is equal to $7.0 g/cm^3$.

Lab scale weighing procedure for samples over 10 grams

For larger catalyst amounts, a pycnometer may not be required and in such cases a graduated cylinder would be more convenient.

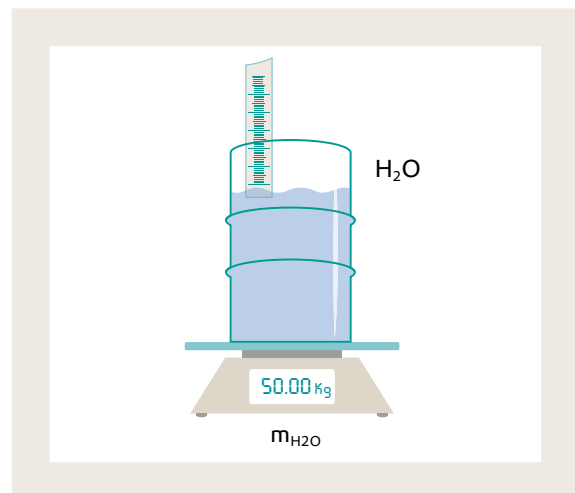
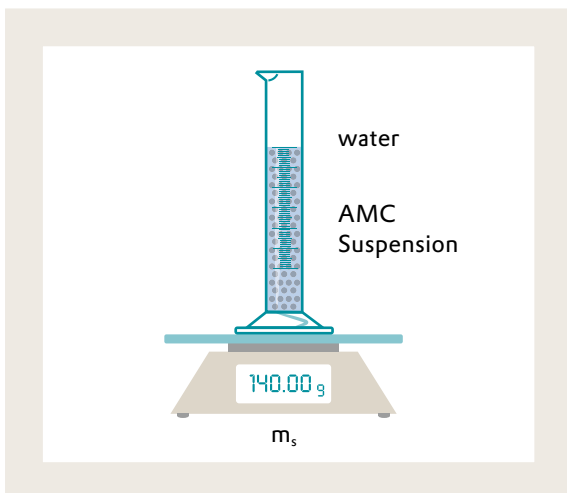
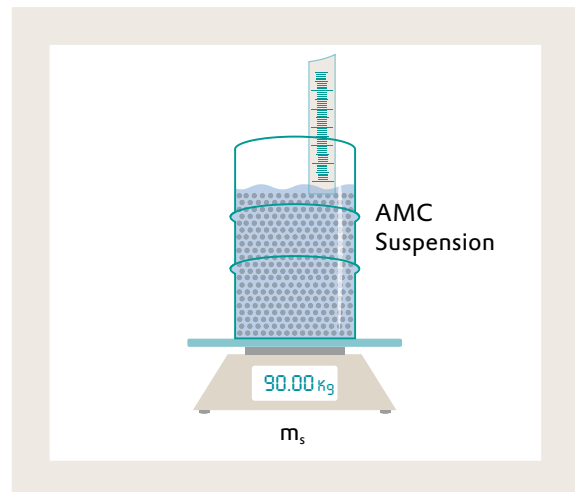
Fill a graduated cylinder to a defined volume with water, weigh it, and record this weight as m_{H_2O} . Pour out the water, add the desired amount of AMC suspension, add enough water to the suspension to reach the same volume as before, weigh it, and record this weight as m_s . Calculate the dry weight of the catalyst (m_{cat}) according to equations 1 and 2 above.



Kg scale weighing procedure for commercial applications

On a kg scale, drums need to be used to determine the dry weight of the catalyst.

Weigh the drum containing the catalyst and record this value as m_s . Mix the catalyst slurry and measure the distance from the top of the drum to the top of the catalyst slurry. Fill an empty identical drum with water exactly to the same level as the drum with the catalyst. This is done by adjusting the distance from the water level to the top of the drum to the same value as was measured on the catalyst drum. Weigh the drum with the adjusted water volume, record this weight as m_{H_2O} , and calculate the dry weight of the catalyst according to equations 1 and 2 above.



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