**The iron content of steel wool.**

**Aim:** To measure the percentage by mass of iron in steel wool.

**Overview:** A weighed amount of steel wool is dissolved in sulphuric acid:

Fe(*s*) + 2 H+(*aq*) → Fe2+(*aq*) + H2(*g*)

To determine the amount of Fe2+ the solution is titrated with potassium permanganate in acidic solution: Fe2+ + MnO4− → Fe3+ + Mn2+ \*)

The titration is finished when a weak violet colour of permanganate sustains.

**Equipment:** Scales ±0.001 g, conical flasks 100 mL and 250 mL, measuring cylinder 100 mL,

volumetric flask 250 mL, funnel, filter paper, pipette 25 mL, buret, thermostatic bath, magnetic stirrer, stand.

**Chemicals:** Steel wool, 2 M sulphuric acid, solution of KMnO4 with concentration 0.00200 M.

**Procedure part 1:**

Weigh a piece of steel wool (appr. 1 g) precisely (3 decimals!).

Transfer the piece to a 250 mL conical flask and add appr. 50 mL sulphuric acid.

Heat with a bunsen burner under extraction until all the steel wool is dissolved.

The black particles is not iron.

Pour the hot solution into the volumetric flask through the funnel with filter paper.

Add deionised water almost to the mark and place the flask in the thermostatic bath for 10 minutes.

Fill up the flask exactly to the mark with deionised water and homogenize the content by turning the flask upside down some 50 times.

**Procedure part 2:**

Transfer25.0 mL from the flask to the 100 mL conical flask using the pipette.

Fill the burette with potassium permanganate right to the tip and hang it in the stand.

Place the conical flask on the magnetic stirrer and slowly add permanganate until the weak violet colour sustains. (appr. 18 mL) .

Read the used volume as precisely as possible with 1 decimal.

Go through this part 3 times – rinse the glass wares with water before using them again.

**Calculations and data processing:**

Balance \*) and use it find the amount of iron from the amount of permanganate.

Use the three results to get the mean value of the steel content and the uncertainty of the iron percentage

The expected result is around 98.5%.

**The report:** Give just a short description of the procedure but make a detailed data processing including the uncertainty from the three results.

Evaluate your result comparing with 98.5%.

Balance the equation Fe2+ + MnO4− → Fe3+ + Mn2+ using half equations.