
LABORATORY WORK NO.15

PRECIPITATION REACTIONS II- GRAVIMETRY

■ **PRINCIPLE:** *Gravimetry -Gravimetric analysis*

The basis of gravimetric analysis is the exclusion of substance in the form of sparingly soluble compound and its conversion into a precisely defined compound which is weighed. A sample weight is precipitated with a suitable anti-solvent after conversion into a solution and adjusting reaction conditions. The precipitate will be now disposed of impurities and mother liquor by decantation, filtration and washing on the filter. The isolated precipitate is converted to compound which is exactly defined by drying or annealing.

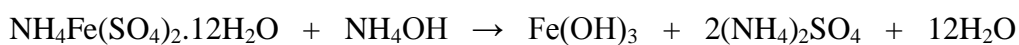
TASK 1. PREPARATION OF FERRIC OXIDE

■ **CHEMICALS:** H₂O, NH₄Fe(SO₄)₂·12H₂O, NH₃ (25%), BaCl₂

■ **AIDS:** Beakers, burner, stand, mesh, graduated cylinder, scales, petri dish, annealing crucible, triangle, annealing furnace (muffle furnace), fractional flask, Büchner funnel, filter paper, pipettes, glass rods, pliers, desiccator

■ **PROCEDURE:**

1. Prepare the 20% solution from 4 g of ammonium-ferric sulphate . Add 200-250 ml of distilled water to the solution. Prepare 500 grams of ammonia solution of 10% concentration by diluting ammonia of 25% concentration and density of 0.91 g/ml (These amounts of solutions serve for the whole group of students).
1. Precipitate the sulphate solution by gradual addition of 10% ammonia solution as long as the brown-red precipitate is formed.
2. Then boil the mixture, decant the precipitate twice with hot distilled water and wash it carefully with distilled water until the filtrate does not create a white precipitate with BaCl₂ solution (proof of SO₄²⁻ ions).
3. Filter the precipitate, dry it at 150 ° C and anneal in the porcelain crucible (weighed in advance) in the annealing furnace at 600 ° C.
4. After annealing, let the porcelain crucible cool down in the desiccator and then weigh it together with the sample.



- **CALCULATIONS:** $R\text{Y} = \text{RealY} / \text{TY} \times 100(\%)$

where: RY = relative yield, RealY = real yield, TY = theoretical yield (calculated from the equation).



	Mr	m(g)	note
$\text{NH}_4\text{Fe}(\text{SO}_4)$		4	20% solution
$\text{NH}_4\text{Fe}(\text{SO}_4) \cdot 12\text{H}_2\text{O}$			-
$\text{Fe}(\text{OH})_3$			precipitate
Fe_2O_3			TY
Fe_2O_3			RealY

- **CONCLUSION:** Fill in the table and calculate the real and relative yields.
- **SECURITY:** Ammonia is a flammable gas which may explode if heated. It causes severe skin burns and eye damage. It is toxic during inhalation.



STUDENT'S SHEET No. 15

PRECIPITATION REACTIONS II- GRAVIMETRY

1) Vocabulary Czech – English from the text

Translate:

1. Hořlavý plyn
2. Žíhání
3. Kádinka
4. Exikátor
5. Petriho miska
6. Oxid železitý
7. Kleštičky
8. Relativní výtěžek

2) Matching words

Match correctly words to their translations:

- | | |
|-------------------------|---------------------|
| 1. flask | A. baňka |
| 2. gravimetric analysis | B. žíhací pec |
| 3. decantation | X. skleněná tyčinka |
| 4. precipitate | Δ. vážková analýza |
| 5. annealing furnace | E. dekantace |
| 6. glass rod | Φ. sraženina |



3) **Translate:**

a) Způsobuje těžké poleptání kůže a poškození očí.

.....

b) Hořlavý plyn

.....

c) Izolovaná sraženina se převede na sloučeninu.

.....

d) Obsahuje plyn pod tlakem; při zahřívání může vybuchnout.

.....

e) Spočítejte skutečný a relativní výtěžek.

.....

f) Toxický při vdechování.

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4) **Word search**

1. RENURB

.....

2. NUFNEL

.....

3. NEQUOIT

.....

4. ATEHULPS

.....

5. ETTLIARF

.....

6. GLINGAENAN BLEICRUC

.....

5) **Spelling/Word search:**

1. EX__U__I__N__ vyloučení

2. S__L__B__E C__P__N__ rozpustná sloučenina

3. __ADU__ED C__L__DER odměrný válec

4. P__C__P__A__ sraženina

5. __PUR__IES nečistoty

6. M__T__R L__Q__R mateční louh

7. D__C__N__ slít, scedit