علیرضا علی عسکری ۹۰۵

Date: ۱۴۰۱/۰۵/۲۴ Subject:

موضوع: "کودهای شیمیایی"

• مقدمه: ویلیام رامسی کاشف گازهای نجیب پیش‌بینی کرده بود که تا اواسط قرن ۲۰ نیتروژن قابل استفاده کیاهان تمی خواهد شد. اما فریتس هابر توانست کودی شیمیایی از آمونیاک بسازد.

- وسایل مورد نیاز: هیتر مگنت، 50cc ارلن، HNO_3 - NH_3

H_2PO_4 - H_2SO_4

- شرح آزمایش: دمای 100°c

$NH_3 + HNO_3$

$NH_3 + H_2SO_4$

$NH_3 + H_2PO_4$

+ مشاهدات و مستندات آزمایش:

Crocodile Chemistry - untitled

File Edit View Scenes Help

x0.1 x10

Contents

Parts Library

- Chemicals
- Equipment
  - Apparatus
  - Electrochemistry
  - Meters and probes
  - Safety signs
  - Stoppers
    - Large
      - Solid
      - One tube
      - Two tubes
    - Small
- Glassware
- Indicators
- Presentation

Properties

Erlenmeyer flask

Flask 1

Appearance

Show...

Volume scale

Glass colour Black

Glass width 2

Reaction details

Observed Chemical Properties

HNO_3 1 M +:50 cm^3

H_2SO_4 1 M +:50 cm^3

H_3PO_4 1 M +:50 cm^3

NH_3 1 M +:50 cm^3

Reactions

Current

$H_2O(l) \rightarrow H_2O(g)$

Recently completed

$NH_3(g) \rightarrow NH_3(aq)$

$H_3PO_4(aq) \leftrightarrow H_2PO_4^-(aq) + H^+(aq)$

$NH_4^+(aq) \leftrightarrow NH_3(aq) + H^+(aq)$

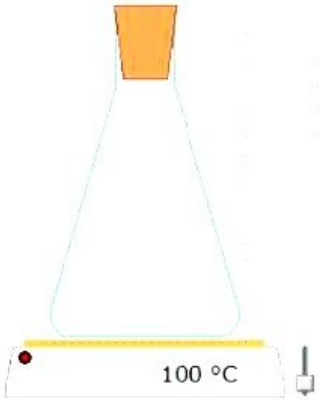
$H_2PO_4^-(aq) \leftrightarrow HPO_4^{2-}(aq) + H^+(aq)$

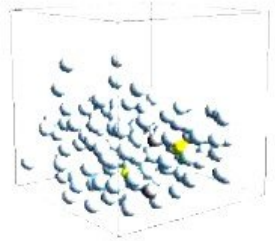
In solution

Liquids

Gases

Physical Properties





H_2O

NH_4^+

$H_2PO_4^-$

Scene 1 Scene 2 Scene 3

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Erlenmeyer flask

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Glass width 2

Reaction details

Observed Chemical Properties

HNO_3 1 M +:50 cm^3

H_2SO_4 1 M +:50 cm^3

H_3PO_4 1 M +:50 cr

NH_3 1 M

Reactions

Current:

$H_2O(l) \rightarrow H_2O(g)$

Recently completed:

$NH_3(g) \rightarrow NH_3(aq)$

$NH_4^+(aq) \leftrightarrow NH_3(aq) + H^+(aq)$

$HSO_4^-(aq) \rightarrow SO_4^{2-}(aq) + H^+(aq)$

$NH_3(aq) + H_2O(l) \rightarrow NH_4^+(aq) + OH^-(aq)$

$H_2SO_3(aq) + NH_2OH(aq) \rightarrow H_2O(l) + NH_4HSO_3(aq)$

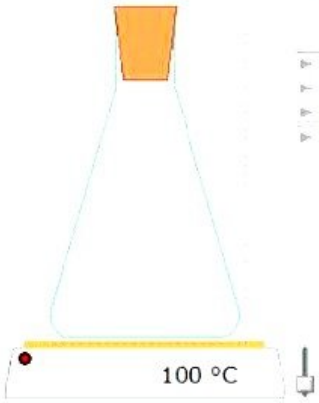
$NH_3(aq) \rightarrow NH_3(g)$

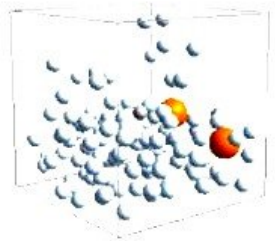
In solution

Liquids

Gases

Physical Properties





H_2O

NH_4^+

HSO_4^-

Scene 1 Scene 2 Scene 3

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x0.1 x10

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Observed Chemical Properties

m

HNO_3 1 M +:50 cm^3

H_2SO_4 1 M +:50 cm^3

H_3PO_4 +:5

NH_3

Reactions

Current:

$H_2O(l) \rightarrow H_2O(g)$

Recently completed:

$NH_3(g) \rightarrow NH_3(aq)$

$NH_4^+(aq) \leftrightarrow NH_3(aq) + H^+(aq)$

$NH_3(aq) \rightarrow NH_3(g)$

$NH_3(aq) + H_2O(l) \leftrightarrow NH_4^+(aq) + OH^-(aq)$

In solution

Liquids

Gases

Physical Properties

100 °C

H_2O

NH_4^+

NO_3^-

Scene 1 Scene 2 Scene 3

Date: Subject:

• نتیجه گیری :

[redacted]

واکنش حاصل از کود شیمیایی :

$$NH_3 + HNO_3 \left(H_3PO_4 + NH_4OH \rightarrow H_2O + NH_4H_2PO_4\right)$$