**Introduction**

- **Features of Titanium**
  1. Light and high-strength
  2. Corrosion resistance
  3. Biocompatibility
  4. Some titanium alloys: shape memory superelasticity

- **Production of Ti sponge in the world (2005)**
  - Japan: 30.5 kt (29% share)
  - Russia: 28 kt
  - Ukraine: 21 kt
  - Kazakhstan: 8.2 kt
  - China: 6.6 kt

**Features**
- High-purity Ti can be obtained.
- Metal/salt separation is easy.
- Chlorine circulation is established.
- Effective Mg electrolysis has been utilized.

**Experimental works**

**Part I**

**Temperature, \( T \) / K**

- **1000**
- **1100**
- **1200**

**Disproportionation reactions of TiCl\(_2\)**

- **Formed on the surface of titanium metal in its interior.**

- **MgCl\(_2\)** is expected to work.

- **Experimental results 1**

- **Fig. 1**: Photograph of the sample after the experiment.

**Part II**

**Disproportionation reactions of TiCl\(_2\)**

- **Experimental results 1**

**Titanium production by disproportionation reactions of TiCl\(_2\)**

**Features**
- Suitable for producing "high purity Ti" without use of reductants such as Mg.
- Disproportionation reaction can be applied to "titanium coating" on substrates like steel.
- New application of efficient usage of "titanium scraps".

**Conclusion**

- More efficient production process of TiCl\(_2\) from TiCl\(_4\).
- Development of high-purity Ti production process due to effective utilization of titanium scraps.