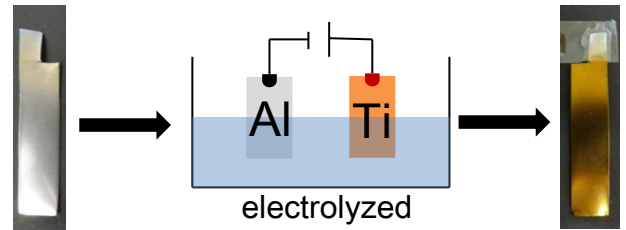


Anodic oxidation of titanium

Purpose

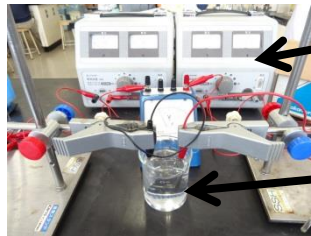
From literature, I happened to know about an experiment that the surface of *titanium* would change color through an anode *oxidation*. When we tried to do the experiment, the color of *titanium*'s surface changed. We started this research because we were interested in this vivid change. Our purpose is to change the surface color by controlling the condition of the *electrolysis* whose anode is *titanium*.



Experiment

We electrolyzed by using *titanium* as anode, and *aluminum* as cathode. We changed three conditioning: *electrolytes*, *voltage*, and *energization time*.

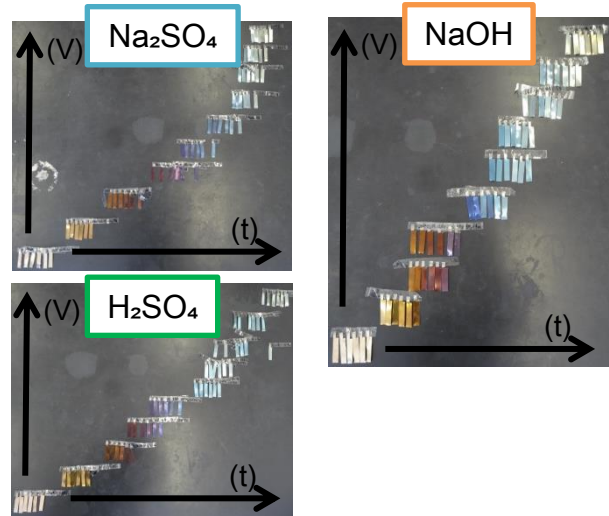
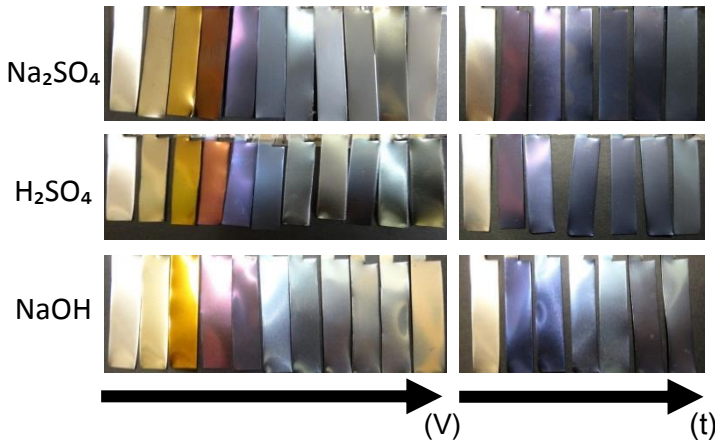
0.25 sec. ~ 5 min.



5V ~ 50V

Na₂SO₄ aq, H₂SO₄ aq, NaOH aq

Finding



Discussion

- It can be considered that the chemical reaction which changes *titanium* into *titanium oxide* create a film on the *titanium*.
- It can be estimated that the differences in the structure of crystal and film's thickness makes a clear color.
- We think that it takes a little time for *titanium* to be covered with the *titanium oxide* film.
- At high voltage, we thought that O₂ got into the film which can be formed even at a low voltage, creating a new film with different crystal structure.
- We suppose that the difference in a solution's pH makes a difference in the amount of O₂ which is produced by electrolysis, and it makes a subtle color difference.

