

Analysis of Explosive Chemical Compound Crystal Using Image from Polarized Light Microscope

The explosive compounds that have mostly been found nowadays are ammonium nitrate and potassium nitrate.

To analyze the explosive compounds, the advanced instruments have been used. However they are very expensive, complicated and require specialists to operate such instruments. In this research, the polarized light microscope (PLM), which is cheaper and more portable, has been used to identify standard ammonium nitrate and potassium nitrate by analyzing the optical properties. The polarized images of the surface of each sample prepared by fusion preparation have been taken using PLM under the extinction position together with the retarder of 632.8 nm wavelength. The results show that the polarized images have various interference colors. The difference of each color depends on layer thickness. The thickness of each area that has different color could be estimated by using the Michel Lévy chart, when the birefringence of ammonium nitrate and potassium nitrate are 0.224 and 0.171, respectively. Moreover, the grain patterns of ammonium nitrate and potassium nitrate are different, so their patterns could be used to identify their identities e.g. potassium nitrate layer is observed to have more clear grain boundary than ammonium nitrate. These identities of both compounds can be applied in the identification of explosive compound that are very useful in forensic science.

Author: Ms SACHANA, Suphattra (Chulalongkorn University)

Co-authors: SUWONJANDEE, Narumon (Chulalongkorn (TH)); Dr WONGMANEROD, Somrit (Chulalongkorn University)

Presenter: Ms SACHANA, Suphattra (Chulalongkorn University)

Track Classification: Optics, Non-linear Optics, Laser Physics, Ultrafast Phenomena