A Study on the Interfacial Characteristics of Explosives-Binders

심정섭*, 김현수
국방과학연구소
(jsshim@add.re.kr*)

Plastic bonded explosive(PBX) is mainly composed of the nitramine-ploymer compositions. PBX is characterized by high velocity and pressure of detonation, low vulnerability and good thermal stability. Many important applications of PBX require the good adhesion between nitramine crystals and the binder. For PBXs as well as propellants, where good adhesive force is of great importance, dewetting therefore must be prevented by strong adhesion between filler-binder.
In this study, PETN, HMX, HNIW and 3 kinds of copolymers are selected, since they are widely used in many plastic bonded explosives. The technical objective of this investigation is to predict the interaction between filler and binder from their interfacial characteristics.
The surface free energies of explosives powder and copolymers have been determined from the contact angle values using the wilhelmy and wicking method.
Interfacial tension between explosive and binder was used to calculate the geometric mean method and work of adhesion between explosive and binder was used to calculate the Kaelble method.