58th Annual Fuze Conference
Current Landscape:

Advanced weaponry provided to assist regular and irregular foreign security forces carries a danger that the weapons are transferred to our enemies.

“We must be the great arsenal of democracy.”
- Franklin Delano Roosevelt (1940)
STRATEGIC CHALLENGES

- SOLD ON THE BLACK MARKET
- CAPTURED FROM OUR ALLIES
- POST-CONFLICT STOCKS
Our Solution

- Self-deactivate / Neutralize Fuzes
- Warhead Chemical Deactivation
SELF-DEACTIVATION FUZE MECHANISM
CHEMICAL CONVERSION OF HE

- INEXPENSIVE COMPONENTS WITH LOW ENERGY

- CONTROLLED TRANSFORMATION:
  HIGH EXPLOSIVE $\rightarrow$ LOW EXPLOSIVE $\rightarrow$ INERT COMPOUNDS

- EXPERIMENTATION PROXY POTASSIUM NITRATE
  $\text{CuCl}_2(s) + 2\text{KNO}_3(s) \rightarrow 2\text{KCl}(s) + \text{Cu(NO}_3\text{)}_2(s)$
KN03 Cyclic Voltametry
Deactivator with KN03 embedded
Deactivated KN03 after 1 hour
CYCLIC VOLTAMETRY AFTER 1 HOUR
**THERMODYNAMICS OF DEACTIVATION**

\[ \text{CuCl}_2(s) + 2\text{KNO}_3(s) \rightarrow 2\text{KCl}(s) + \text{Cu(NO}_3)_2(s) \]

**COMPOUND:** \text{STANDARD ENTHALPY OF FORMATION (KJ/MOL)}

- \text{KNO}_3 (S) \quad -494.6
- \text{KCl} (S) \quad -436.68
- \text{CuCl}_2 (S) \quad -206
- \text{Cu(NO}_3)_2 (S) \quad -302

\(-206 + 2\times(-494.6) = -1195.2\)

\(2\times(-436.68) + -302 = -1175.36\)

**ENTHALPY OF REACTION:** \(+19.84\text{ KJ/MOL}\)
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