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DEVELOPMENT OF TRIAZINE AND HEPTAAZAPHENALENE COMPOUNDS AS
HIGH ENERGY MATERIALS

A Thesis

Submitted to the School of Graduate Studies and Research

in Partial Fulfillment of the

Requirement for the Degree

Master of Science

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Oxidation of melamine (12) and melem (14) was done using mainly hydrogen peroxide (H_2O_2) as an oxidant and sodium tungstate (Na_2WO_4) as a catalyst. 30% and 60% Hydrogen peroxide (H_2O_2) were used but 30% was enough to achieve some form of oxidation. A reaction of melamine (12), 60% Hydrogen peroxide, Sodium tungstate and 1,10-phenanthroline in a ratio of 1: 20: 0.2:0.2 at a temperature of 80°C for 3 hours produced a mononitromelamine (MNM) (62). FT-IR and mass data show m/z of 157 for the MNM (62) and dodecazaphenalene (70), with m/z of 245. This product ignited on a hot plate. Melting point for the pale yellow powder obtained was $>260^\circ\text{C}$ and a shock test conducted, found it safe within the limit $20\text{g} < X < 50\text{g}$. Melem (14) was produced by heating melamine (12) on a hot plate at 540°C . 60% yield was obtained and this could be easily optimized. At pH of below 1.0, two main absorptions were prominent, 212nm and 235nm while for the UV at pH 7.0, 206nm and 240nm. UV for the neutral solution was 222nm and 240nm. Our melem (14) have absorptions of 206nm and 240nm in neutral pH. A reaction of melem (14), 60% Hydrogen peroxide, Sodium tungstate and 1, 10-phenanthroline in a ratio of 1: 35: 0.2: 0.1 at a temperature of 80°C for 3 hours, yielded a pale yellow product which could be mononitromelem (63), but melem (14) is practically insoluble in an solvent which makes finding any data to support the partial oxidation of melem (14) very difficult.