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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 (H₂O₂) as an oxidant and sodium tungstate (Na₂WO₄) as a catalyst. 30% and 60% Hydrogen peroxide (H₂O₂) 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 dodecaza phenalene (70), with m/z of 245. This product ignited on a hot plate. Melting point for the pale yellow powder obtained was >260°C and a shock test conducted, found it safe within the limit 20g< X < 50g. 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.