Melt castable explosives are necessary for moldability. 2,4,6-Trinitrotoluene (TNT) is the classic explosive used for castablity, but most explosives lack the stability to survive above their melting point. Therefore, TNT is often used as the matrix in which other explosives are mixed, e.g. Composition B: 40% TNT/60% cyclotrimethylenetrinitramine (RDX) or Pentalite: 50% TNT/50% pentaerythritol tetranitrate (PETN). However, there are several problems with TNT: it lowers the overall performance of the mixture; it is toxic; and it is no longer made in North America. For these reasons, new materials that can be melt cast are in demand. Erythritol tetranitrate (ETN) is a nitrate ester that melts at 60-61°C and is thermally stable as a liquid at temperatures well above that, making it a candidate for melt casting. Lower temperatures are often desirable for melt casting processes. One way to lower the melting temperature is to use a eutectic mixture. Eutectics of ETN will have melting temperatures below 60-61°C, resulting in safer processing. Several eutectics of ETN have been reported in the literature; however, we are investigating new compositions which may be suitable for cast boosters.