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Effects of Epoxy Resin and Graphite on Impact Sensitivity of KClO_4 -type Pyrotechnics Composite

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Abstract: To expose the safety of KClO_4 -type pyrotechnics composite, seven 50/50/ m/n - KClO_4 /Al/epoxy resin/graphite mixture systems ($m=n=0$; $m=3, n=0$; $m=5, n=0$; $m=5, n=1$; $m=5, n=2$; $m=5, n=3$; $m=5, n=4$) known as samples 1[#]-7[#] in this work were prepared, respectively. The effects of epoxy resin and graphite on the impact sensitivity of KClO_4 -type pyrotechnics composite were studied by standard method GJB772A-1997-601.1, TG-DTA and SEM. The results show that the explosion percent of impact sensitivity for samples 1[#]-7[#] is 0, 60, 76, 40, 12, 2 and 0, respectively. In comparison with sample 1[#], adding epoxy resin in samples 1[#] makes the explosion percent of impact sensitivity of samples 2[#] and 3[#] enhance and with increasing the amount of epoxy resin in samples 3[#], the explosion percent of impact sensitivity increases. In comparison with sample 3[#], the addition of graphite into samples 4[#] makes the explosion percent of impact sensitivity of samples 4[#]-7[#] decreases and with increasing the amount of graphite in samples 3[#], the explosion percent of impact sensitivity decreases in the order 4[#]>5[#]>6[#]>7[#]. The reasons of sensitization of epoxy resin and desensitization of graphite to the KClO_4 -Al binary system are discussed.

Key words: physical chemistry; pyrotechnics composite; adhesive; graphite; impact sensitivity; TG-DTA

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