Decomposition of Hydroxylamine/Water Solution added Metal Ion

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ABSTRACT

Decomposition hazards of hydroxylamine (HA)/water solution with the metal ion was studied in this paper. Heat accumulation storage test for HA 50% (wt)/water solution with the iron ion was conducted to obtain information about thermal stability.

The mixture hazards by adding the iron ion or iron powder were investigated by DTA (differential thermal analysis) experiment. Thermal stability of HA 85%/water solution with the iron ion or iron powder was discussed on the basis of the heat-release onset temperature.

Reactivity of HA/water solution with the metal ion such as iron, cupper, nickel, chromium and manganese was examined by measuring mass loss rate after metal ion was added to HA/water solution.

The following conclusions are made:

1. HA 50%/water solution with the 0.9 ppm iron ion generated the heat release when the ambient temperature was 75 °C in the heat accumulation storage test. Maximum temperature difference from the ambient temperature was approximately 11 °C.

2. The heat-release onset temperature of HA 85%/water solution which contained the 30 ppm iron ion decreased approximately 60 °C compared to that of HA/water solution without the iron ion in DTA experiment. The heat-release onset temperatures decreased when concentration of the iron ion or iron powder increased.

3. The ignition automatically began when the 0.5% (wt) iron was added to HA 85%/water solution. In contrast, decomposition reaction of HA 85%/water solution with the copper ion was calm compared to that of the iron ion. HA/water solution did not react with other ions.