

## Synthesis of High-purity 3,3'-Diamino-4,4'-azoxyfurazan (DAOAF)

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**Abstract:** 3,4-Diaminofurazan (DAF) was synthesized from glyoxal and hydroxylamine by one step with yield of 48.0% and purity of 99.8%. 3,3'-Diamino-4,4'-azoxyfurazan (DAOAF) was successfully obtained through the reaction of DAF and potassium monopersulfate triple salt ( $\text{KHSO}_5 \cdot 0.5\text{KHSO}_4 \cdot 0.5\text{K}_2\text{SO}_4$ ) as oxidant in the buffer system of  $\text{NaHCO}_3$  solution. Its structure was characterized by IR,  $^1\text{H}$  NMR and MS spectra. The purity of DAOAF was determined by HPLC and the impurities contained were also qualitatively and quantitatively analyzed. The optimum synthesis conditions are determined as follows: the molar ratio of  $n(\text{DAF}) : n(\text{NaHCO}_3) : n(\text{KHSO}_5 \cdot 0.5\text{KHSO}_4 \cdot 0.5\text{K}_2\text{SO}_4)$  is 1 : 6 : 4 for 5 h at 20–25 °C, the yield and purity of crude product are 84.1% and 98.2%, respectively. The impurities contained in the crude DAOAF are DAF, DAAF and ANF. The impurities can be removed effectively by recrystallizing from DMF at 95 °C, thus producing high-purity DAOAF (99.6%), with a total recovery rate of 86.6%.

**Key words:** 3,4-diaminofurazan (DAF); 3,3'-diamino-4,4'-azoxyfurazan (DAOAF); synthesis

**CLC number:** TJ55; TQ564; O62

**Document code:** A

**DOI:** 10.11943/j.issn.1006-9941.2017.10.008



## 《含能材料》“损伤与点火”征稿

含能材料的损伤特征与点火过程有密切的联系,炸药、推进剂的内部损伤及其对力学特性、安全特性和点火行为的影响规律受到了含能材料学界的高度重视,为推动这一重要研究方向的学术交流,本刊特设立“损伤与点火”专栏。专栏主要征集炸药、推进剂等含能材料的损伤观测与多尺度表征技术、含损伤的本构方程、准静态与动态损伤演化规律、损伤与破坏的宏(细)观模式、损伤对起爆、爆炸、爆轰成长以及非冲击起爆行为的影响等方向的原创性研究论文。来稿请注明“损伤与点火”专栏。

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