（DCAF）合成及晶体结构［J］. 含能材料，2009，17（4）：385 –
388.
FAN Yan-jie，WANG Bo-zhou，ZHOU Yan-shui，et al. Synthe-
sis and crystal structure of 3，3′-dicyano-4，4′-azofurazan
（DCAF）［J］. *Chinese Journal of Energetic Materials*（*Hanneng*

Cailiao），2009，17（4）：385 –388.

［34］ Leonard P W，Chavez D E，Pagoria P F，et al. Azotetrazolyl-
furazan and nitrogenous salt derivatives［J］. *Propellants*，*Explo-
sies*，*Pyrotechnics*，2011，36：233 –239.

Review on Insensitive Non-metallic Energetic Ionic Compounds of Tetrazolate Anions

BI Fu-qiang，**FAN Xue-zhong**，**XU Cheng**，**WANG Bo-zhou**，**ZHENG Ya-feng**，**GE Zhong-xue**，**LIU Qing**
（*Xi'an Modern Chemistry Research Institute*，*Xi'an* 710065，*China*）

Abstract：Non-metallic energetic ionic compounds of tetrazolate anion are a kind of insensitive energetic materials. The progresses in the insensitive non-metallic energetic salts of aminotetrazolate，nitrotetrazolate，nitraminotetrazolate，azotetrazolate and furazan fuctionalized tetrazolate anions were reviewed in detail. It is found that most of ionic compounds based on tetrazolate anions which contain traditional energetic functionalities upon the carbon of positon 5 such as nitro and nitrimino functionalities，show high sensitivities，while the sensitivities of ionic compounds based on 5-aminotetrazolate，5，5′-azotetrazolate and 5-（4-aminofurazan-3-yl）tetrazolate are so low that they can be used as insensitive energetic materials. Furthermore，new trends in research of insensitive non-metallic energetic ionic compounds of tetrazolate anion were proposed.
Key words：applied chemistry；insensitive；tetrazolate；energetic ionic compounds；research progress；review

❉ 读者·作者·编者 ❉