

## Quantitative Analysis of Migrating Components in Interface of NEPE Propellant/Liner/Insulation

HUANG Zhi-ping, TAN Li-min, CAO Qing-wei, MA Xin-gang

(The 42nd Institute of the Fourth Academy of CASC, Xiangfan 441003, China)

**Abstract:** The main migrating components in the interfaces of standard  $\Phi 25$  mm cylinder samples of nitrate ester plasticized polyether (NEPE) based propellant/hydroxyl terminated polybutadiene (HTPB) based liner/ethylene-propylene-diene terpolymer (EPDM) based insulation were quantified by using high performance liquid chromatography (HPLC) and gas chromatography (GC). The results show that plasticizers of nitroglycerin (NG) and 1,2,4-butanetriol tri-nitrate (BTTN), as well as function reagent of AD, which are the main components migrating in the interface, are separated well simultaneously by HPLC, while plasticizer of dioctyl sebacate (DOS) is only found by GC. The recovery ratios of the established HPLC method for determination of NG, BTTN and AD, and GC method for determination of DOS are more than 90%, and the coefficients of variation are less than 6% for these components in the liner. The precision and accuracy of the methods are satisfied for common determination. The results show that NG, BTTN and AD in the propellant can migrate to the liner and insulation with more content in the liner, while AD migrates more obviously than NG and BTTN, and AD even concentrates in the liner. DOS in the liner only migrates to the insulation, not to the propellant.

**Key words:** polymer chemistry; NEPE propellant; interface; migration; quantitative analysis; high performance liquid chromatography (HPLC); gas chromatography (GC)

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