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Separation of TAT and TRAT using HPLC

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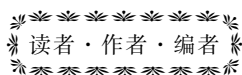
Abstract: A high performance liquid chromatography (HPLC) method was developed for the separation of 1,3,5,7-tetraacetyl-1,3,5,7-tetraazacyclooctane (TAT) and 1,3,5-triacetyl-1,3,5-triazacyclohexane (TRAT), which are the intermediates for the synthetic reaction of 1,3,5,7-tetranitro-1,3,5,7-tetraazacyclooctane (HMX). The chromatograms of TAT and TRAT were further confirmed by high performance liquid chromatography-mass spectrometry (HPLC-MS). The optimal separation conditions are: silica column (4.6 mm × 250 mm i. d., 5 μm), mobile phase: acetonitrile/water (75/25, V/V); the flow rate is 1.0 mL · min⁻¹, the wavelength is 215 nm, the injection volume is 20 μL.

Key words: analytic chemistry; 1,3,5,7-tetraacetyl-1,3,5,7-tetraazacyclooctane (TAT); 1,3,5-triacetyl-1,3,5-triazacyclohexane (TRAT); 1,3,5,7-tetranitro-1,3,5,7-tetraazacyclooctane (HMX); 1,3,5-trinitro-1,3,5-triazacyclohexane (RDX); high performance liquid chromatography (HPLC)

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应中国工程物理研究院化工材料研究所的邀请,俄罗斯圣彼得堡国立工学院 Ilyushin M. A. 教授来四川绵阳讲学。Ilyushin 教授主要从事以唑类为配体的过渡金属高氯酸盐配合物作为起爆药剂的合成、性能及应用研究。Ilyushin M. A. 教授首先合成出了一系列以 3-胍基-4-氨基-1,2,4-三唑、3-胍基-4-氨基-5-甲基-1,2,4-三唑、3-胍基-4-氨基-5-巯基-1,2,4-三唑和 5-胍基四唑等为配体的具有光敏特性的过渡金属高氯酸盐配合物,使用单脉冲激光发生器 (20 ns, 1060 nm 和 530 nm 两种波长) 研究了配合物及以它们为基的配方起爆性能,特别是对粘剂用量、不同添加剂 (碳黑、金刚石、富勒烯和碳纳米管等) 及用量对配方起爆能力的影响及机理进行了深入研究。与会科研人员围绕激光起爆药剂的合成、样品的制备、起爆机理、激光起爆器的应用等多方面与 Ilyushin 教授进行了广泛的交流,开拓了视野,有助于提升科研能力。

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