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Robust lanthanide metal-organic frameworks with highly sensitive sensing of aniline and slow magnetization relaxation behaviors

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Abstract: Two new three-dimensional lanthanide frameworks [Ln(BTB)(H₂O)]_n (Ln = Eu (**1**) and Dy (**2**)) based on 1,3,5-benzenetricarboxylic acid (H₃BTB) were synthesized and characterized. Structural analysis reveals that they were isostructural, in which two lanthanide ions are bridged by four carboxylic groups from different BTB³⁻ in the modes of $\mu_2\text{-}\eta^1\eta^1$ and $\mu_2\text{-}\eta^1\eta^2$ to form a binuclear unit. The binuclear units are built into one-dimensional chain via two $\mu_2\text{-}\eta^1\eta^1$ carboxylic groups, which are further linked by BTB³⁻ to generate three-dimensional frameworks. Compound **1** displays excellent solvent stability. The luminescent investigations suggest that **1** exhibits high sensitive sensing to aniline. Importantly, **1** as a promising luminescent detector for aniline can be recycled at least for four times. Additionally, magnetic studies reveal that **2** displays slow magnetic relaxation behaviors with the energy barrier ($\Delta E/k_B$) of 9.36 K under an external dc field (dc = 2500 Oe).

Keyword: metal-organic frameworks, luminescent, aniline, slow magnetic relaxation

1. Introduction

Lanthanide-based metal-organic frameworks (Ln-MOFs) have attracted intense attention owing to their intriguing structures, as well as the promising

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