Tunable luminescence evolution and energy transfer behavior of Na₃Sc₂(PO₄)₃:Ce³⁺/Tb³⁺/Eu³⁺ phosphors

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| Table S1. Crystallographic data for NSPO. |
|-----------------------------------------|
| Formula | Na₃Sc₂P₃O₁₂  |
| Crystal system | trigonal  |
| Space group | R3c (167)  |
| a/Å | 8.931(4)  |
| b/Å | 8.931(4)  |
| c/Å | c=22.326(7) |
| α /° | 90  |
| β /° | 90  |
| γ /° | 120  |
| V/Å³ | 1542.20(109)  |
| Z | 6  |
Table S2. Atomic parameters for NSPO.

| Atom | Wyckoff | Site | x/a  | y/b   | z/c     |
|------|---------|------|------|-------|---------|
| Sc1  | 12c     | 3    | 0    | 0     | 0.3513(1) |
| P1   | 18e     | 2    | 0    | 0.2948(1) | 1/4    |
| O1   | 36f     | 1    | 0.1729(2) | 0.1925(2) | 0.4113(1) |
| O2   | 36f     | 1    | 0.0243(3) | 0.2096(3) | 0.1944(1) |
| Na1  | 18e     | 2    | 0.6372(2) | 0     | 1/4    |
Fig. S1 (a) SEM of NSPO synthesized by our group; (b, c and d) SEM of NSPO reported in other literatures. 26-28.

26 H. Guo, X. Y. Huang, Y. J. Zeng, J. Alloys Compd. 2018, 741, 300-306.
27 H. Guo, B. Devakumar, B. Li, X. Y. Huang, Dyes and Pigments. 2018, 151, 81-88.
28 R. Vijayakumar, H. Guo, X. Y. Huang, Dyes and Pigments. 2018, 156, 8-16.
Fig. S2 (A) The PL and PLE of the Na$_3$Sc$_2$(PO$_4$)$_3$:Eu$^{3+}$ by ceramic method$^{26}$; (B) the PL and PLE of the Na$_3$Sc$_2$(PO$_4$)$_3$:Eu$^{3+}$ by hydrothermal method.

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Fig. S3 Excitation spectra in the range of 300 to 500 nm of the NSPO:0.1Tb$^{3+}$ phosphor upon an emission at 548 nm.
Fig. S4 Emission spectra of the NSPO:0.1Eu$^{3+}, y$Tb$^{3+}$ phosphor upon an excitation wavelength at 219 nm.
Fig. S5 Emission spectrum of the NSPO:0.01Tb³⁺,yCe³⁺ (y = 0, 0.05, and 0.10) phosphors upon an excitation wavelength at 278 nm.