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単粒子からの蛍光体開発 (I) 手法の基本理念**Discovery of New Phosphors from One Single Particle (I) – The Basic Concept of the Approach**

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Nitride phosphors (M-Si-(Al)-(O)-N: Re, M = alkaline earth or lanthanide metal, Re = rare earth metal) have recently emerged as an important class of spectral converters in white light-emitting diodes widely applied in general lighting, backlight as well as vehicle headlights. The discovery of totally new nitridosilicate compounds for phosphor hosts thus attracts great interests to both academic and industry communities. The combinatorial synthesis method has been considered as a high-throughput method for screening and identifying materials with new compositions or optimized properties, but it faces obstacles to be used in the powder library samples of ternary or high-order nitrides often containing multi-phases that lead to an inaccurate luminescence mapping and a very time-consuming for the phase separation, phase identification, and luminescence property assessments. In this presentation, we propose an interesting and very effective approach for the rapid discovery of new nitride phosphors – the *single-particle-identification approach*. This approach allows the localized analysis of crystal structure, composition and luminescent property (spectrum, quantum efficiency and thermal quenching) of one single phosphor particle with the size down to 1-10 μm in diameter, and promises to simultaneously identify a number of new phosphors from the powders prepared by the conventional powder processing. It has enabled us to discover more than 50 new luminescent materials with several of them being industrialized.