Combinatorial Screening and Optimization of Phosphors for Flat Panel Displays and Lighting

손기선*, 이재문, 유정곤
순천대학교 재료금속공학과
(kssohn@sunchon.ac.kr*)

In an attempt to search for new promising phosphors for plasma display panel (PDP) and light emitting diode (LED), a solution based combinatorial chemistry method involving high throughput synthesis and characterization has been employed. Besides this conventional combinatorial chemistry, a more advanced screening strategy, which hybridizes combinatorial chemistry and computational heuristics such as genetic algorithm and artificial neural network, was also employed. Several examples of phosphor search based on the above-described conventional high-throughput combinatorial chemistry as well as the hybridized strategies were addressed in the present study. Part 1 dealt with the conventional high through-put combinatorial search for new phosphors for PDP application without employing any computational optimization strategy, and thereby providing with the result from the combinatorial screening based on Eu^{3+}-doped Y(As,Nb,P,V)O_4 quaternary system and Tb^{3+}-doped CaO-Gd_2O_3-Al_2O_3 ternary system. In particular, phase identifications for optimum compounds obtained from combinatorial screening were also dealt with. Part 2 was more concerned with computational optimization rather than the conventional high throughput combinatorial chemistry.