

## Abstract

We theoretically simulate the performance of ultranarrow emitters for the first time to achieve record high coverage for the International Telecommunication Union Radiocommunication Sector BT.2100 (Rec.2100) and National Television System Committee (NTSC) color gamut. Our results, employing more than 130-m parameter sets, include the investigation into peak emission wavelength and full width at half maximum (FWHM) values for three primaries that show ultranarrow emitters, i.e., nanoplatelets are potentially promising materials to fully cover the Rec.2100 color gamut. Using ultranarrow emitters having FWHM as low as 6 nm can provide the ability to attain 99.7% coverage area of the Rec.2100 color gamut as well as increasing the NTSC triangle to 133.7% with full coverage. The parameter set that provides possibility to fully reach Rec.2100 also has been shown to match with D65 white light by making use of the correct combination of those three primaries. Furthermore, we investigate the effect of the fourth color component on the CIE 1931 color space without sacrificing the achieved coverage percentages. The investigation into the fourth color component, cyan, is shown for the first time to enhance the Rec.2100 gamut area to 127.7% with 99.9% coverage. The fourth color component also provides an NTSC coverage ratio of 171.5%. The investigation into the potential of emitters with ultranarrow emission bandwidth holds great promise for future display applications.