

Effects of Binders in Phosphorescent Coating Colors on the Illumination in Paper

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ABSTRACT

In this study, phosphorescent powders, resins and chemical aids (bridging agent, thickening agent) were blended by stirring together the ingredients to create phosphorescent coating colors. The coating colors containing different resins were then coated on paper with a bar coater to form phosphorescent night vision papers so as to investigate the effects of different resins on the phosphorescent performance of the coated papers. Binder A added to phosphorescent powders A and B resulted in good phosphorescence of the resulting papers having L^* values of ca. 70; the binder in combination with a purple phosphorescent powder D achieved L^* value of ca. 50. Therefore, binder A was deemed to work well in combination with phosphorescent powders of A, B, and D. When binder B combined with phosphorescent powder B, a L^* value of 84 was achieved; while it in combinations with phosphorescent powders C and D gave respectively coated paper L^* values of almost 80, and > 50 . These results were satisfactory for night vision uses. Although binder B in combination with phosphorescent powder A produced L^* of only 60, however, by reducing its dose, a L^* gain of 10 points could be attained. Therefore, binder B was deemed to work well with all phosphorescent powders. Binder C in combination with phosphorescent powders A, B, and D produced coating color of poor performances. However, by reducing its dose, L^* values increased by 5 points. Binders A, B, and C in combination with phosphorescent powder E produced coated papers with L^* values of 55~60. Although phosphorescent powder E was a short-effect agent, its residual luminance could last only 5 min, and binders A, B, and C were deemed not suitable for phosphorescent powder E. As for surface strengths of the coated paper, the best coating color combination was binder C with phosphorescent powder C, a wax pick value of 11~12 was attained. The poorest color combination was binder B with phosphorescent powder E, which gave wax pick value of only 8~9.

Keywords : phosphorescent powders、 phosphorescent night vision coating color、 coating、 coated paper、 residual luminance

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