Suthida Piriyakarnsakul 2012: Addition of Special Characteristics in Exterior Gold Paint by Nano Titanium Dioxide. Master of Science (Environmental Technology and Management), Major Field: Environmental Technology and Management, Department of Environmental Science. Thesis Advisor: Assistant Professor Jukkrit Mahujchariyawong, Ph.D. 113 pages.

The special characteristics of the exterior gold paint were developed for high temperature resistance and self cleaning property. Two different types of nano titanium dioxide (nano-TiO_2), hydrophilic and oleophilic anatase nano-TiO_2 were used for mixing in acrylic water and oil based paints which ratios of nano-TiO_2 and paints were 0.25, 0.5, 0.75, 1, 2, 5, 10 and 15% (w/v). Wood, cement and iron sheets were used for testing the characteristics of coated materials and the gold paint without nano-TiO_2 was used as control. The result showed that apparition and gloss of both acrylic water and oil based paints on all coated samples decreased while nano-TiO_2 dosages were increasing. However, less than 1% mixing ratios kept the same property of control. Acrylic base coating were applied to material surfaces before painting, the samples with and without base coating showed the same appearances. Heat distortion test was conducted in hot air oven for 1 hour at each temperature of 40, 50, 60, 70, 80, 90, 100, 110, 120, 150 and 200 °C. Acrylic water based paint coated on three types of materials enhanced heat resistance at all mixing ratios of nano-TiO_2. Self cleaning test was considered as soot washing and the result showed that 0.25 - 0.75% nano-TiO_2 mixing ratios were better than 1 - 5% ratios and control samples as well. Furthermore, Measuring Device showed the increasing contact angle of coatings of the gold paints with nano-TiO_2. The optimum nano-TiO_2 mixing ratio in acrylic water based paint for wood, cement and iron sheet were 0.5, 0.5 and 0.75%, respectively. The optimum ratio in acrylic oil based paint for all 3 materials were 0.25%. The results of Thai Industrial Standard test, gold paints with nano-TiO_2 had passed the other qualities as the control. In addition a point-of-view on commerce, while the cost increased 1.5 - 4.5%, nano-TiO_2 gold paints had incentives on cost-benefit and cost-effectiveness.

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