Multiple-pass friction stir processing (FSP) was employed to impregnate Ti, Y and Ce oxide powders into the surface of an aluminium alloy. The FSP processed surface composite was subsequently anodized with an aim to develop optical effects in the anodized layer owing to the presence of incorporated oxide particles which will influence the scattering of light. This paper presents the investigations on relation between microstructure of the FSP zone and optical appearance of the anodized layer due to incorporation of metal oxide particles and modification of the oxide particles due to the anodizing process. The effect of anodizing parameters on the optical appearance of the anodized surface was studied. Characterization was performed using FIB-SEM and TEM. The surface appearance was analysed using spectrophotometry technique which measures the diffuse and total reflectance of the surface. The appearance of the anodized surface changed from dark to bright upon increasing the anodizing voltage. Particles in the FSP zone were partially or completely modified during the anodizing process and modified the morphology of the surrounding anodized Al matrix which has a clear influence on the mechanism of light interaction like scattering and absorption from the anodized surface.