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Thermally Engineered Blue Photoluminescence of Porous Anodic Alumina Membranes for Promising Optical Biosensors SANG DON BU, SAM YEON CHO, Chonbuk National University, YONG CHAN CHOI, Chonbuk National University, Daegu Gyeongbuk Institute of Science Technology, JIN WOO KIM, JIN KYU HAN, JIN HO KWAK, SUN A YANG, Chonbuk National University — Optical biosensors based on porous anodic alumina membranes (PAAMs) have shown to be an effective device because of their unique optical properties and biocompatibility. Among various optical properties, photoluminescence (PL) emission derived from PAAMs is one of the most suitable characteristics. However, the origin of PL from PAA is unclear and still in doubt. Therefore, it is essential for further potential practical applications to understand the origin of PL and PL variations. Here, we investigate the effects of post-annealing temperatures on the blue PL of amorphous PAAMs fabricated in oxalic acid. We find that the blue PL emission is strongly dependent on the thermal properties. A strong blue PL at a peak of ˜460 nm is observed from the initial PAAM (not annealed PAAM) and this PL band can be divided into two Gaussian components at 458$\sim$ $\pm$ $\sim$4 nm (P1 band) and 517$\sim$ $\pm$ 7nm (P2 band). As the temperature increases to 600 °C, the intensities of two PL bands gradually increase. During temperature increases from 600 to 700 °C, the P2 band increases but the P1 band decreases. The analyses of electron paramagnetic resonance, Fourier transform infrared spectroscopy, and ultraviolet-visible absorption spectroscopy show that the P1 and P2 bands originate from the unstable carboxylates and the stable carboxylates, respectively.

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