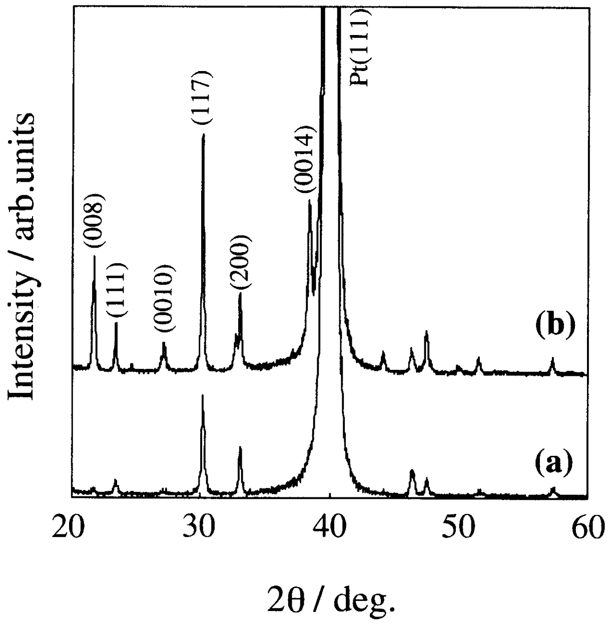

Fig. 4. XRD patterns of $Bi_{3.25}La_{0.75}Ti_3O_{12}$ (a) and $Bi_{3.35}La_{0.75}Ti_3O_{12}$ (b) thin films prepared at 700°C using excimer UV irradiation.

crystallized at 550°C, and the films crystallized at 600°C showed a high crystallinity and a high (117) preferred orientation, as shown in Fig. 5(b). The excimer UV-irradiation in O_2 atmosphere was very effective for the increase of the crystallinity and the promotion of (117) preferred orientation of BLT films. This may be attributable to the promotion of the decomposition of residual organic species with the formation of O_3 along with a photolysis reaction. Furthermore, the calcination at 500°C in an O_2 atmosphere was effective in increasing the crystallinity.

3.4 *Surface morphology of $Bi_{3.35}La_{0.75}Ti_3O_{12}$ thin films*

Figure 6 shows AFM images of the surfaces of $Bi_{3.35}La_{0.75}Ti_3O_{12}$ thin films prepared at 550 and 600°C. The thin films prepared at 550°C using the excimer UV irradiation showed a smooth surface microstructure consisting of fine grains of approximately 100 nm in size, which grew to larger grains of 100–200 nm by annealing at 600°C, compared with those without the excimer UV irradiation. The excimer UV irradiation was found to be useful for improving the surface morphology of BLT films.

3.5 *Ferroelectric properties of BLT thin films*

Figure 7 shows *P–E* hysteresis loops of 700°C-annealed BLT thin films with an excess composition of $Bi_{3.35}La_{0.75}Ti_3O_{12}$ and with a stoichiometric composition of $Bi_{3.25}La_{0.75}Ti_3O_{12}$. $Bi_{3.35}La_{0.75}Ti_3O_{12}$ thin films showed improved ferroelectric properties with a remanent polarization, P_r, of 15.4 $\mu C/cm^2$ and a coercive electric field, E_c, of 64 kV/cm, compared with those of a stoichiometric composition of $Bi_{3.25}La_{0.75}Ti_3O_{12}$.

Figure 8 shows P_r and E_c as a function of applied voltage for $Bi_{3.35}La_{0.75}Ti_3O_{12}$ thin films prepared at 550°C using excimer UV irradiation. The thin films prepared at 550°C using excimer UV irradiation showed a saturation tendency over 5 V. A well-saturated *P–E* hysteresis loop was obtained at an applied voltage of 15 V for the thin film prepared at 550°C, which showed P_r of 4.4 $\mu C/cm^2$ and E_c of 72 kV/cm.

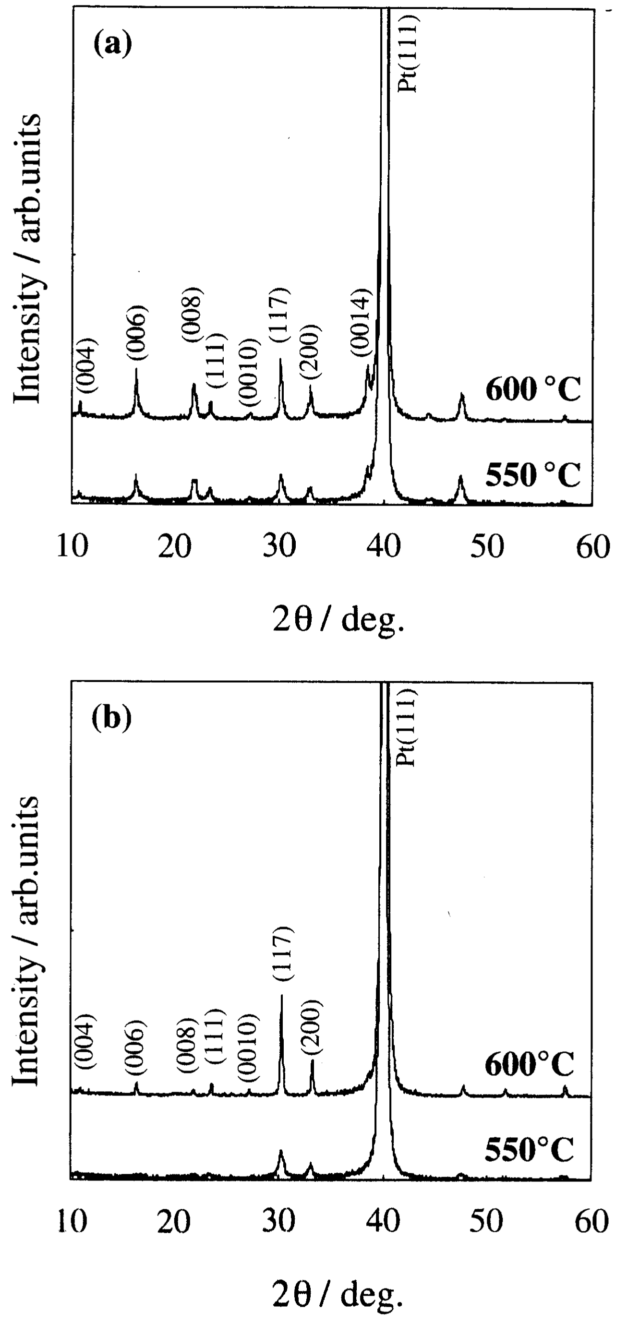

Fig. 5. XRD patterns of $Bi_{3.35}La_{0.75}Ti_3O_{12}$ thin films using (a) excimer UV nonirradiation, and (b) irradiation at 300°C in O_2 atmosphere.

Figure 9 shows *P–E* hysteresis loops at an applied voltage of 5 V for $Bi_{3.35}La_{0.75}Ti_3O_{12}$ thin films prepared at 550–700°C without and with excimer UV irradiation. $Bi_{3.35}La_{0.75}Ti_3O_{12}$ thin films prepared at 550 and 600°C without excimer UV irradiation exhibited P_r of 1.0 and 9.2 $\mu C/cm^2$, and E_c of 38 and 75 kV/cm, respectively, as shown in Fig. 9(a). On the other hand, $Bi_{3.35}La_{0.75}Ti_3O_{12}$ thin films prepared at 550°C using excimer UV irradiation showed P_r of 2.4 $\mu C/cm^2$ and E_c of 44.4 kV/cm. Furthermore, well-saturated *P–E* hysteresis curves were obtained for $Bi_{3.35}La_{0.75}Ti_3O_{12}$ thin films prepared at 600°C using excimer UV irradiation. They showed P_r of 9.8 $\mu C/cm^2$ and E_c of 78 kV/cm, as shown in Fig. 9(b), which are sufficient for ferroelectric memory device applications. The excimer UV irradiation onto as-crystallized BLT thin films was also found