# Reactive chemical vapour deposition (RCVD) of non-volatile terbium aromatic carboxylate thin films

**Oxana V. Kotova,*[a,b] Valentina V. Utochnikova,[a] Sergey V. Samoylenkov,[a] Alexander D. Rusin,[a] Leonid S. Lepnev,[c] Natalia P. Kuzmina*[a]**

**Table S1.** The details of the vapor pressure measurements for Hpobz.

| $T_1$ (K) | $P_1$ (Torr) | $P_0$ (Torr) | P (Torr) |
|---|---|---|---|
| 383.84 | 1.033 | 0.538 | 0.308 |
| 383.73 | 1.030 | 0.546 | 0.305 |
| 383.58 | 1.040 | 0.540 | 0.315 |
| 383.53 | 1.042 | 0.553 | 0.317 |
| 383.34 | 1.032 | 0.545 | 0.308 |
| 383.19 | 1.044 | 0.556 | 0.320 |
| 383.14 | 1.040 | 0.543 | 0.316 |
| 420.35 | 2.109 | 0.940 | 0.762 |
| 420.35 | 2.097 | 0.929 | 0.750 |
| 420.35 | 2.083 | 0.938 | 0.736 |
| 420.36 | 2.118 | 0.955 | 0.771 |
| 420.35 | 2.123 | 0.957 | 0.776 |
| 420.34 | 2.124 | 0.952 | 0.777 |
| 420.34 | 2.121 | 0.943 | 0.774 |
| 437.25 | 3.559 | 1.474 | 1.407 |
| 437.48 | 3.607 | 1.450 | 1.454 |
| 437.33 | 3.603 | 1.450 | 1.451 |
| 437.15 | 3.568 | 1.470 | 1.416 |
| 437.06 | 3.586 | 1.446 | 1.435 |
| 437.04 | 3.618 | 1.443 | 1.467 |
| 437.03 | 3.629 | 1.464 | 1.478 |

Three runs were carried out. The furnace was heated to a fixed temperature, and seven $T_1 - P_1$ readings were taken. The reaction cell was then cooled to the room temperature, and five $P_0 - T_0$ readings of the residual gas were taken. The vapor pressure P was derived as a difference $P=P_1 - P_0$. Experimental data are presented in the table.

Enthalpy and entropy of vaporization were determined by minimization of the sum $\sum\left(P_{\exp} - P_{calc}\right)^2$ according to the equation $R\ln P = \Delta S - \Delta H / T$ to be $\Delta H\left(416\,K\right) = 12654 \pm 282\,cal \cdot mol^{-1}$ and $\Delta S = 16.48 \pm 0.65 cal \cdot mol^{-1} \cdot K^{-1}$. The calculation was performed at a confidence probability 0.95. The total standard deviation in pressure amounted to 0.045 Torr. The correlation coefficient between $\Delta H$ and $\Delta S$ was equal to -0.99904, *i.e.* the uncertainties in $\Delta H$ and $\Delta S$ given above are meaningless.

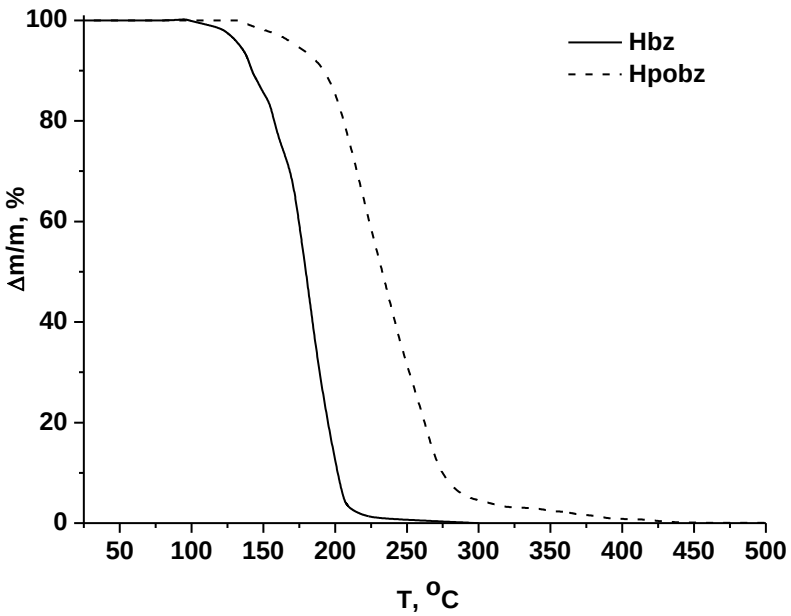


**Figure S1.** Curves of weight loss for Hbz and Hpobz under nitrogen atmosphere.

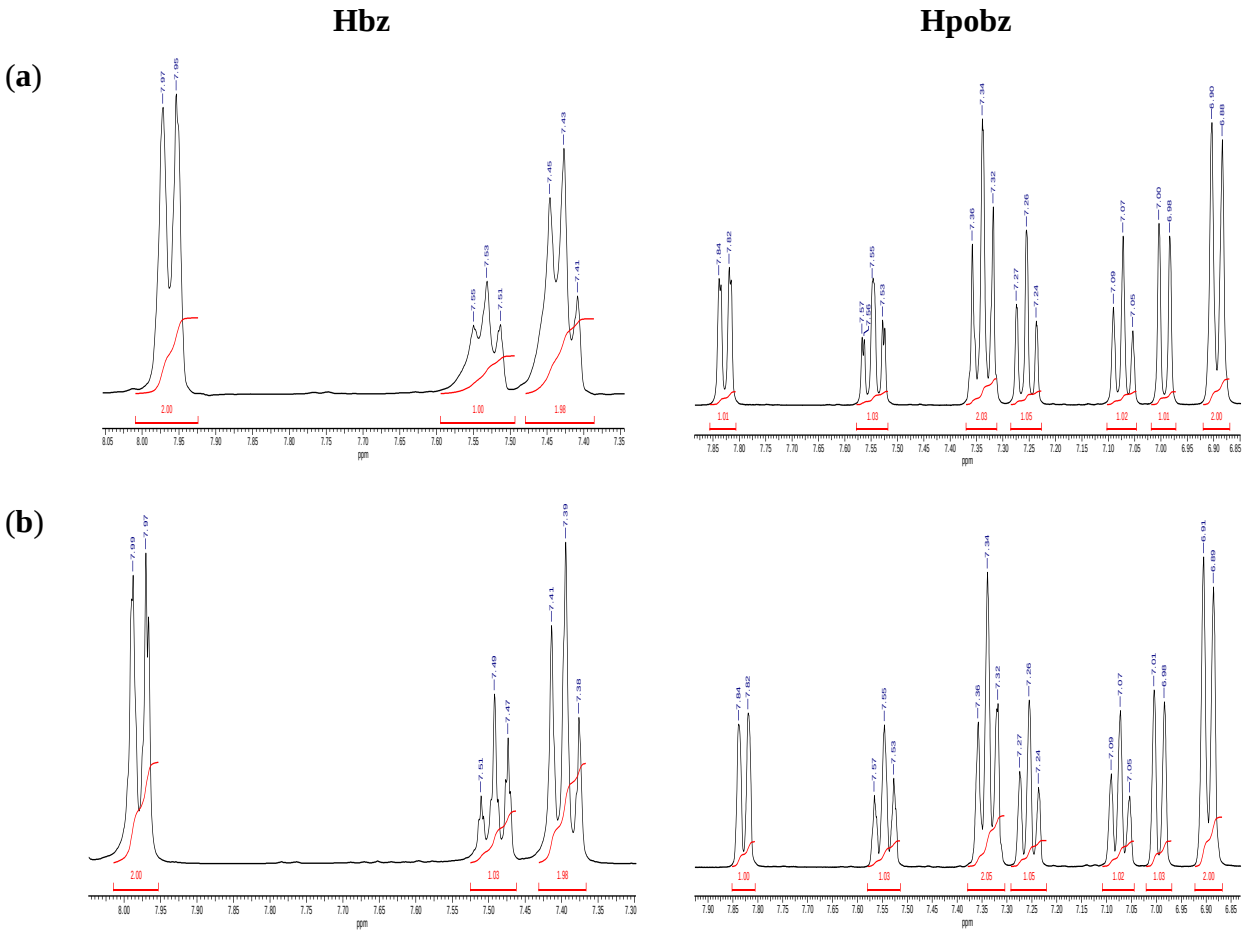


**Figure S2.** $^{1}$H NMR (400 MHz, DMSO-d$^{6}$) of Hbz and Hpobz (a) before and (b) after annealing at 300 °C during six hours ($p \sim 10^{-2}$ Torr; for clarity only aromatic region is shown).

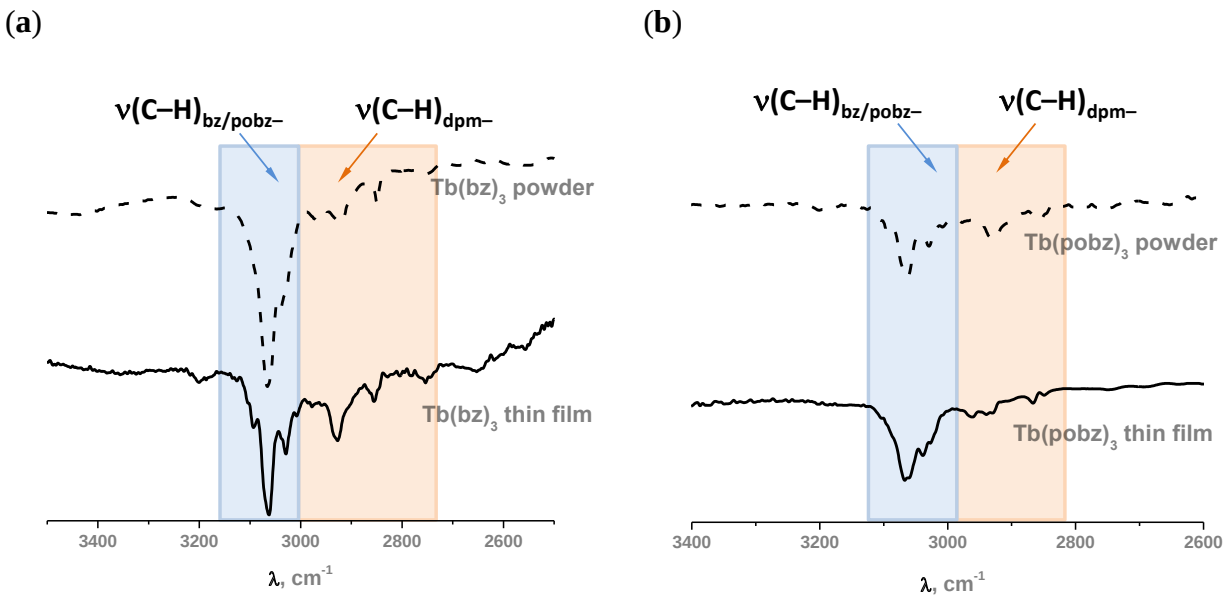


**Figure S3.** IR spectra of (a) $Tb(bz)_3$ and (b) $Tb(pobz)_3$ (powder and thin films).

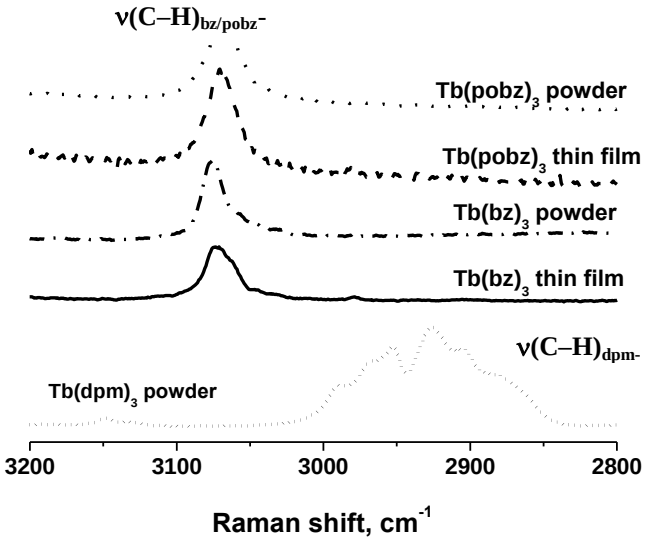


**Figure S4.** Raman spectra of (a) $Tb(bz)_3$ and (b) $Tb(pobz)_3$ (powder and thin films).

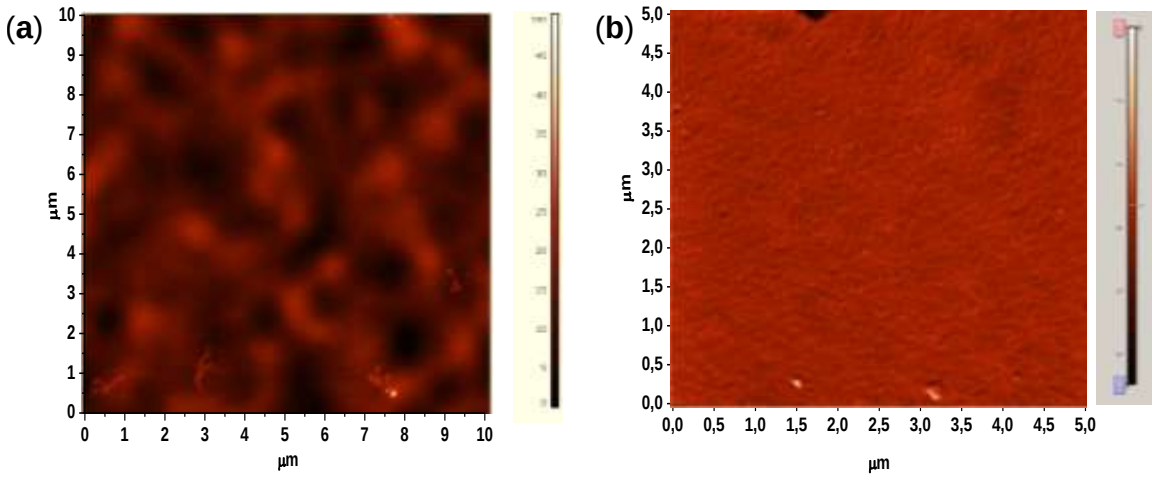


**Figure S5.** AFM images of $Tb(bz)_3$(1) (Fig. 2(b)) annealed at 150 ºC during: (a) 5 and (b) 30 minutes ($10^{-2}$ Torr).

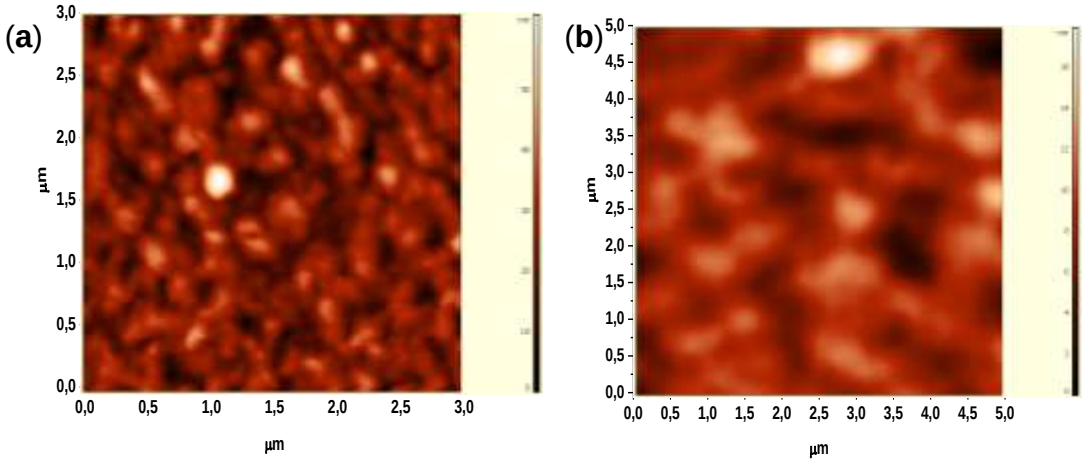


**Figure S6.** AFM images of $Tb(bz)_3$ thin film obtained at $T_3$ = 250 °C without (a) and with (b) further annealing at 150 ºC during 30 minutes ($10^{-2}$ Torr).

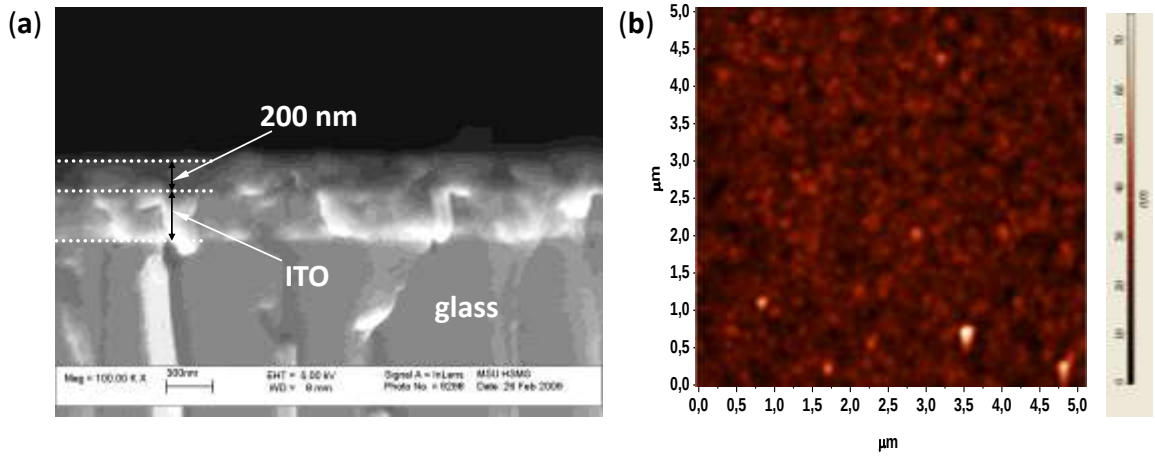


**Figure S7.** (a) SEM and (b) AFM images of Tb(pobz)$_3$ thin film obtained at $T_3$ = 250 °C and further annealed at 150 °C during 30 minutes ($10^{-2}$ Torr).