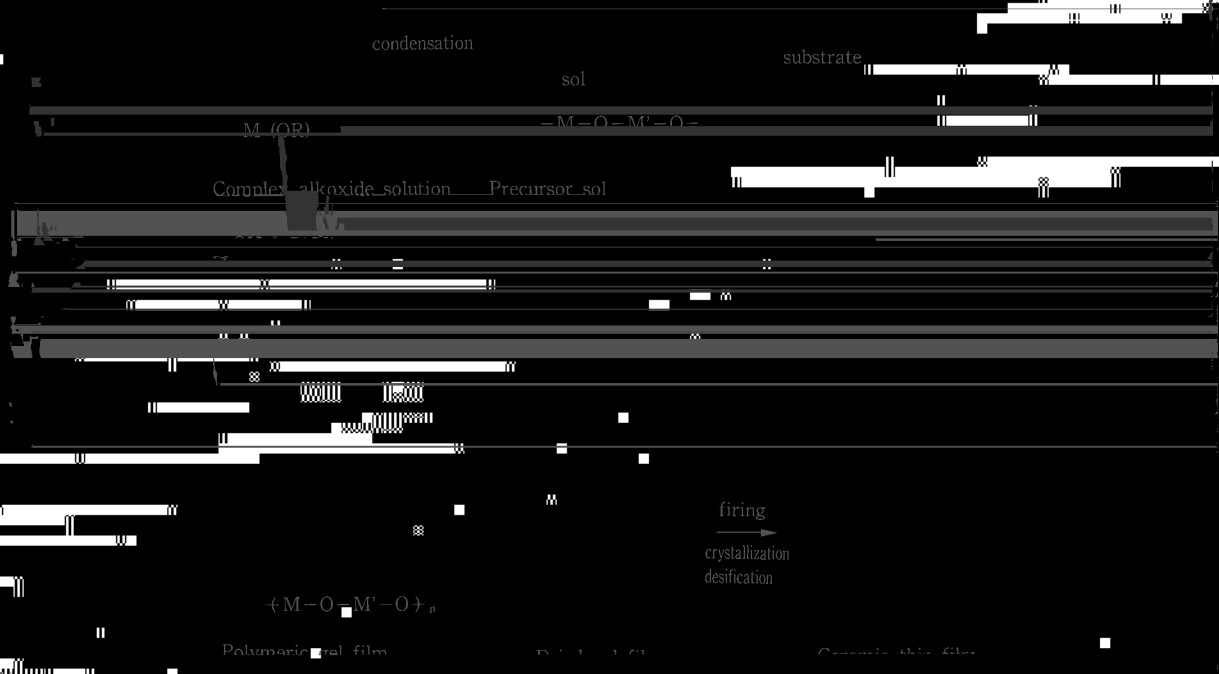


Fig. 1. Sol-gel process for preparation of thin films.



20

100

110

120

function of heating temperature.

□ : n-PrOH

△ : AcOH

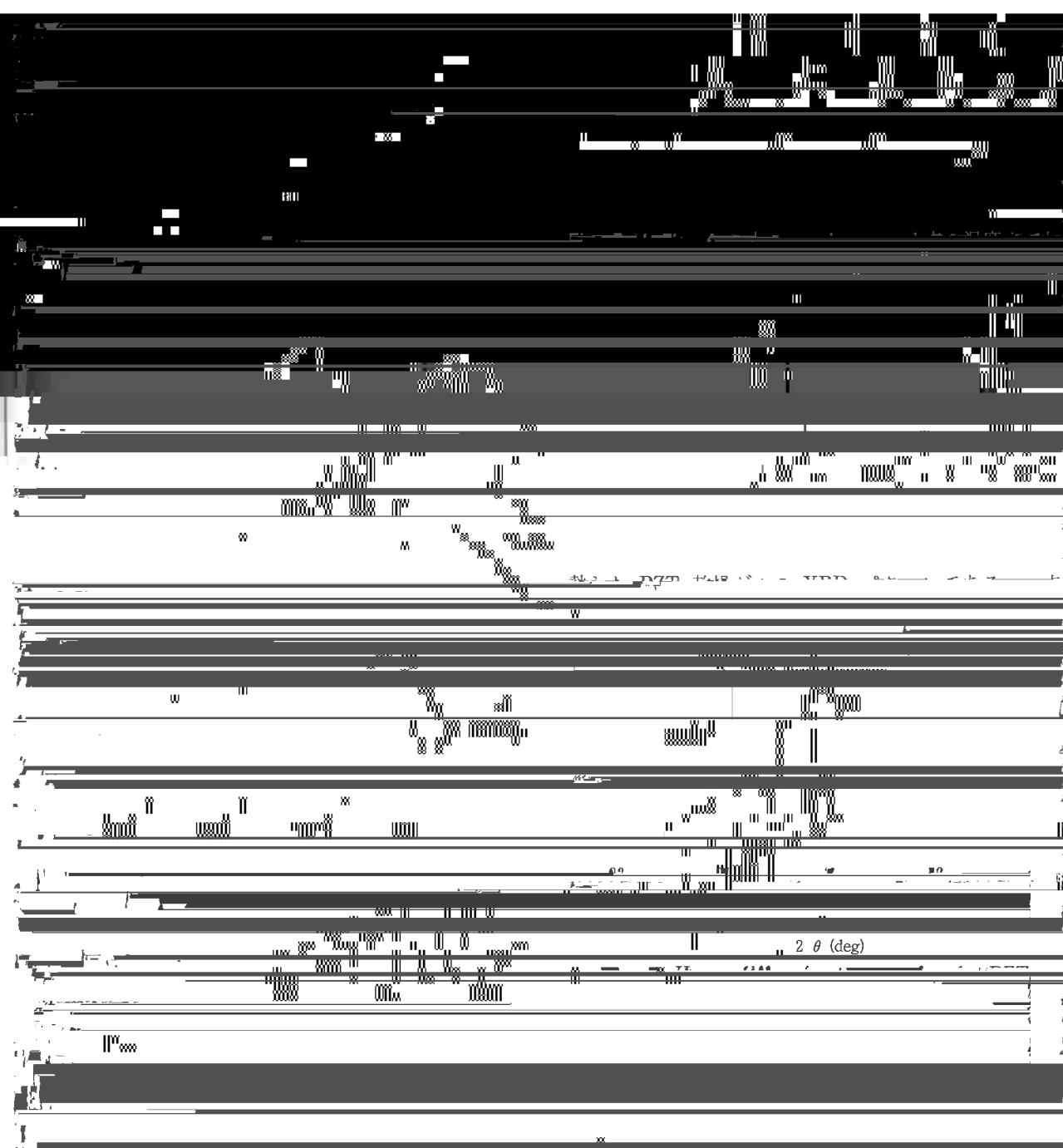
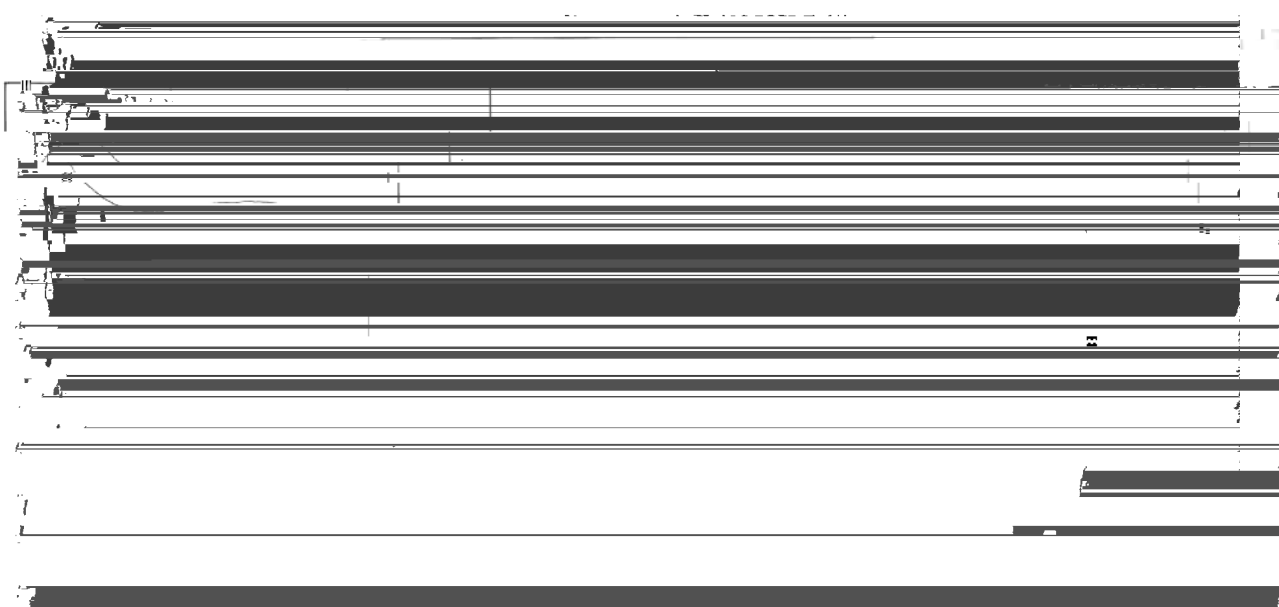
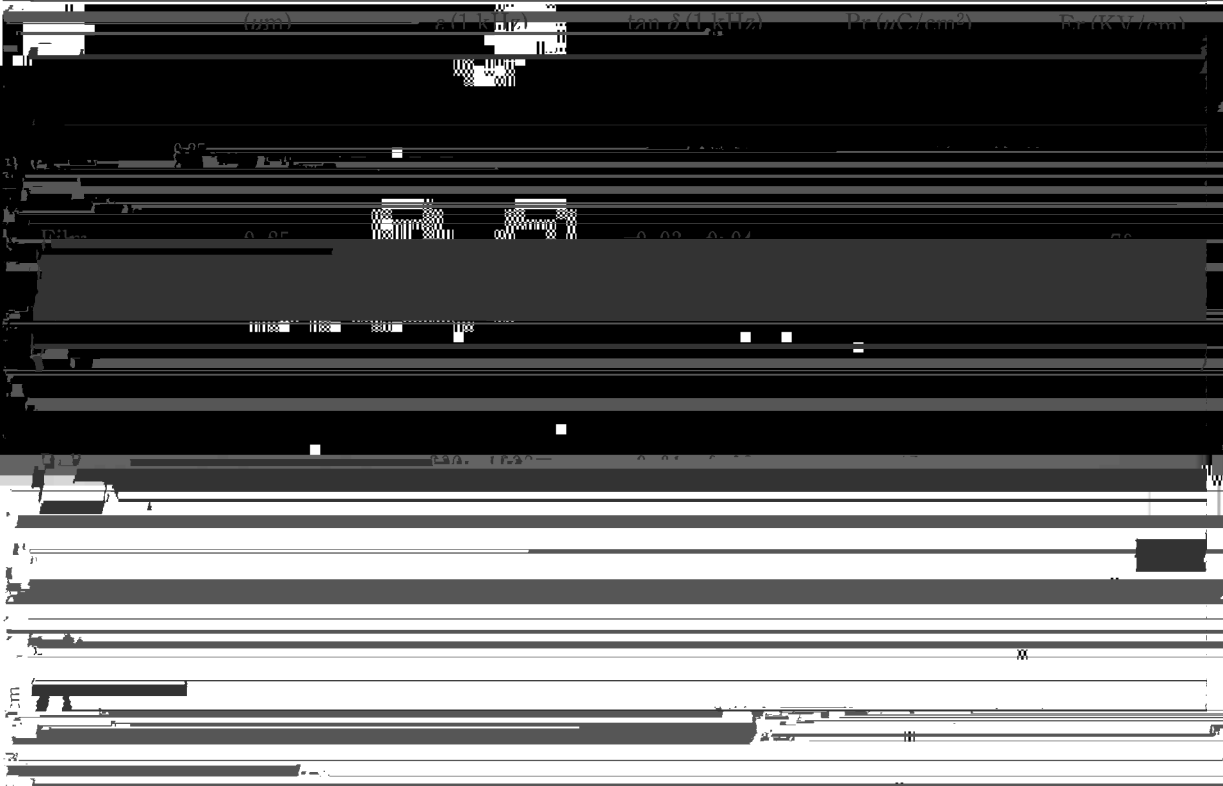


Table 1 Electric properties of the PZT thin film and bulk ceramics

| Sample | Thickness (nm) | ϵ_r (kHz) | $\tan \delta$ (kHz) | P_r (nC/cm ²) | P_r (KV/cm) |
|--------|----------------|--------------------|---------------------|-----------------------------|---------------|
| 1 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 2 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 3 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 4 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 5 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 6 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 7 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 8 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 9 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 10 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 11 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 12 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 13 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 14 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 15 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 16 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 17 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 18 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 19 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 20 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 21 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 22 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 23 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 24 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 25 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 26 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 27 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 28 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 29 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 30 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 31 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 32 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 33 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 34 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 35 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 36 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 37 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 38 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 39 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 40 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 41 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 42 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 43 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 44 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 45 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 46 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 47 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 48 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 49 | 100 | 20 | 0.005 | 1.5 | 1.5 |
| 50 | 100 | 20 | 0.005 | 1.5 | 1.5 |







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5) 新田正徳 “物性誌” 40, 600 (1970)

氏名 岡村 敏彦

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