

Table 1 各組試片組成條件及相關資料

	試片名稱	體積組成(volumn%)	莫耳組成(mole%)	熱壓條件	相對密度	XRD Phase
1	10Y/90Z	10% Y <sub>2</sub> O <sub>3</sub> +90%ZrO <sub>2</sub>	5% Y <sub>2</sub> O <sub>3</sub> +95%ZrO <sub>2</sub>	1500°C/30min/1 atm Ar	96.3%	cubic ZrO <sub>2</sub> tetragonal ZrO <sub>2</sub> monoclinic ZrO <sub>2</sub>
2	30Y/70Z	30% Y <sub>2</sub> O <sub>3</sub> +70%ZrO <sub>2</sub>	17% Y <sub>2</sub> O <sub>3</sub> +83%ZrO <sub>2</sub>	1550°C/30min/1 atm Ar	98.6%	cubic ZrO <sub>2</sub>
3	50Y/50Z	50% Y <sub>2</sub> O <sub>3</sub> +50%ZrO <sub>2</sub>	32% Y <sub>2</sub> O <sub>3</sub> +68%ZrO <sub>2</sub>	1550°C/30min/1 atm Ar	98.8%	rhombohedral Zr <sub>3</sub> Y <sub>4</sub> O <sub>12</sub>
4	70Y/30Z	70% Y <sub>2</sub> O <sub>3</sub> +30%ZrO <sub>2</sub>	52% Y <sub>2</sub> O <sub>3</sub> +48%ZrO <sub>2</sub>	1550°C/30min/1 atm Ar	96.0%	cubic Y <sub>2</sub> O <sub>3</sub> rhombohedral Zr <sub>3</sub> Y <sub>4</sub> O <sub>12</sub>
5	90Y/10Z	90% Y <sub>2</sub> O <sub>3</sub> +10%ZrO <sub>2</sub>	81% Y <sub>2</sub> O <sub>3</sub> +19%ZrO <sub>2</sub>	1600°C/30min/1 atm Ar	95.1%	cubic Y <sub>2</sub> O <sub>3</sub>
6	Y <sub>2</sub> O <sub>3</sub>	100% Y <sub>2</sub> O <sub>3</sub>	100% Y <sub>2</sub> O <sub>3</sub>	1600°C/30min/1 atm Ar	96.6%	cubic Y <sub>2</sub> O <sub>3</sub>

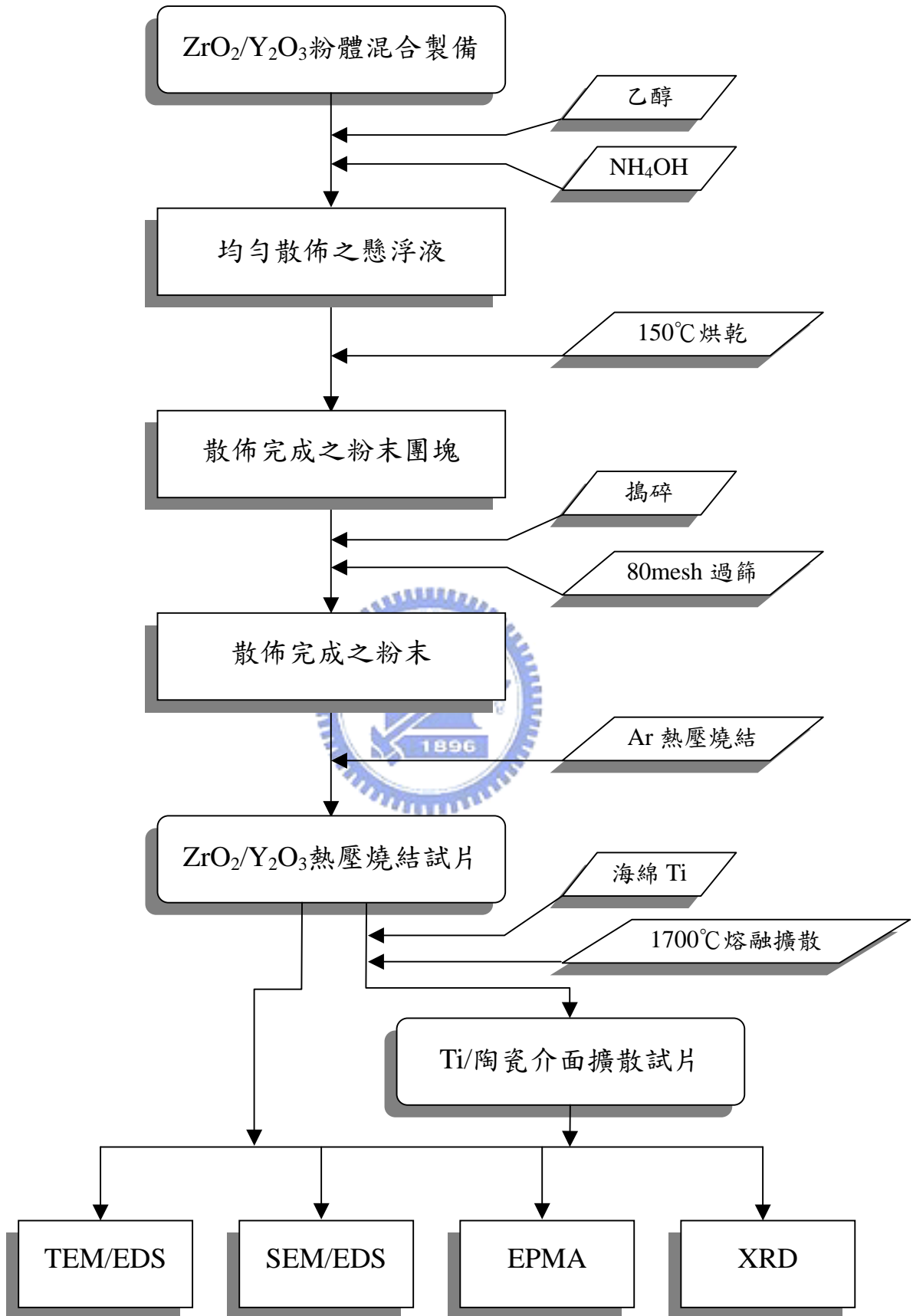


Fig. 3-1 擴散反應實驗流程圖

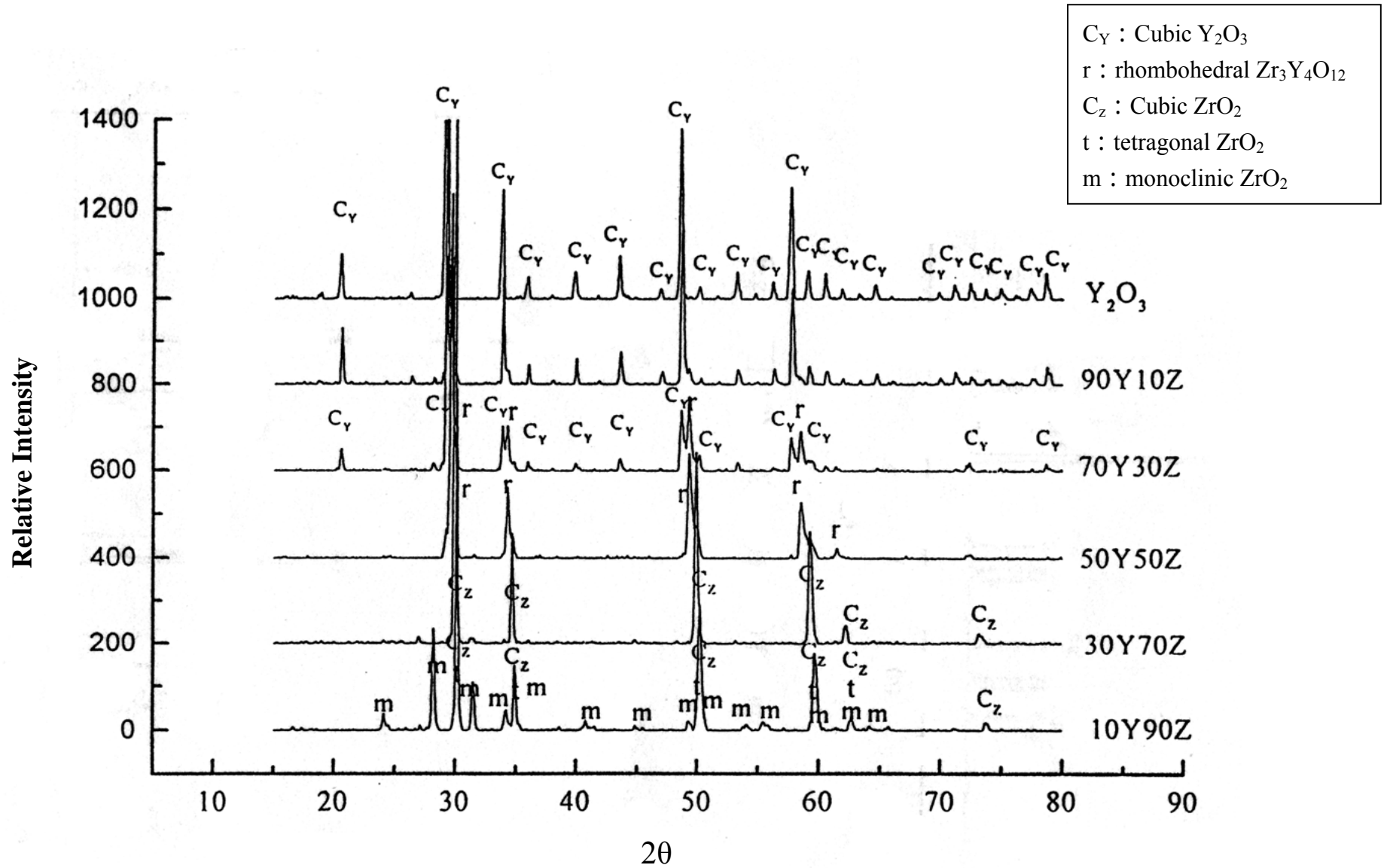
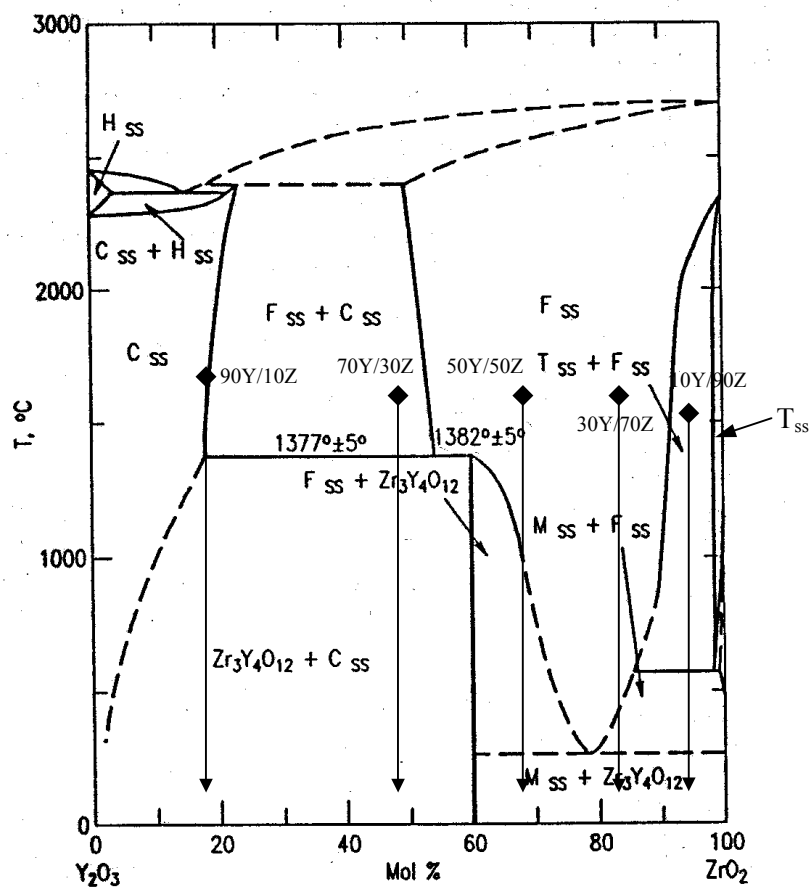


Fig. 4-1 未與融熔鈦擴散反應前各組陶瓷試片之 XRD



M : monoclinic  
 T : tetragonal  
 F : fluorite-type ( $c-ZrO_2$ )  
 H : hexagonal  
 C : cubic ( $Y_2O_3$ )

Fig. 4-2  $ZrO_2$ - $Y_2O_3$ 之二元相圖。

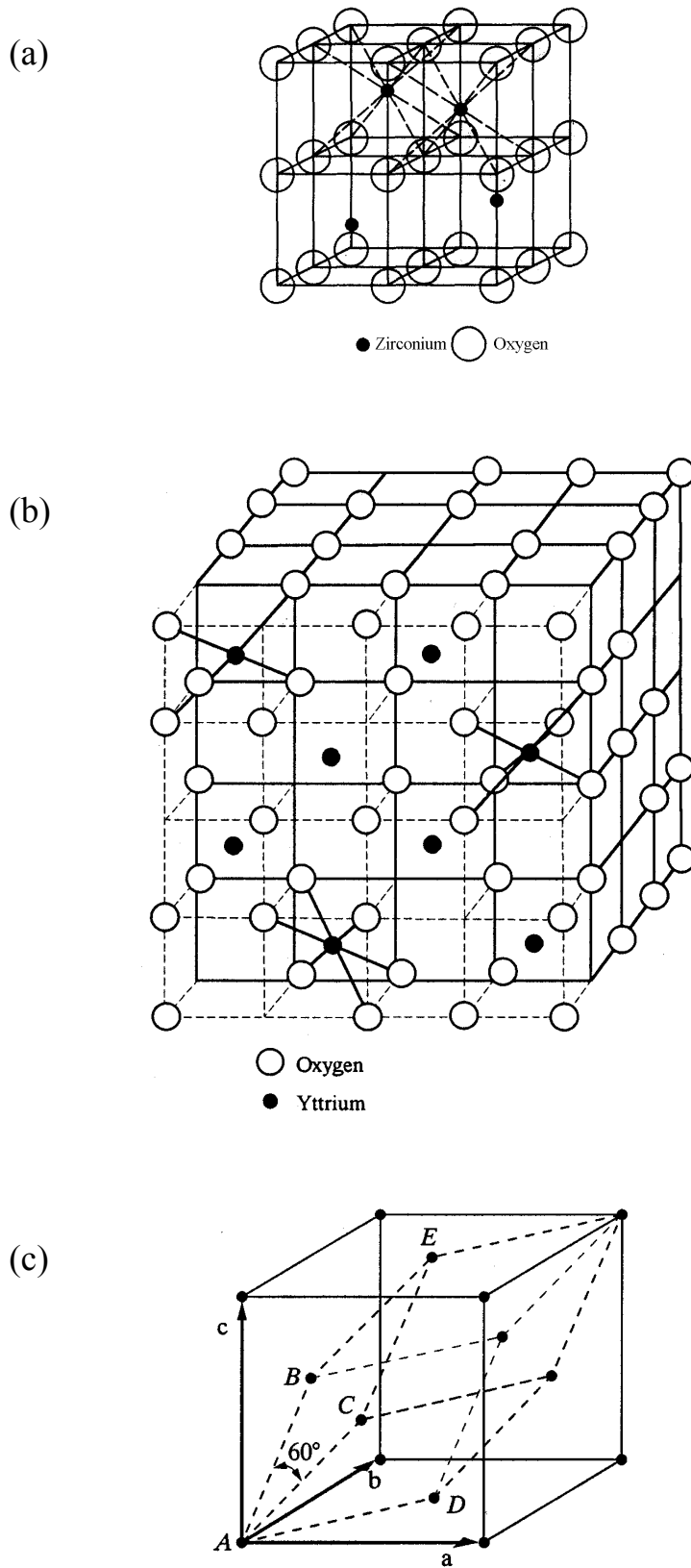


Fig. 4-3 (a) cubic-ZrO<sub>2</sub>的unit cell ; (b) Y<sub>2</sub>O<sub>3</sub>的unit cell ; (c) FCC與Rhombohedral之關係。



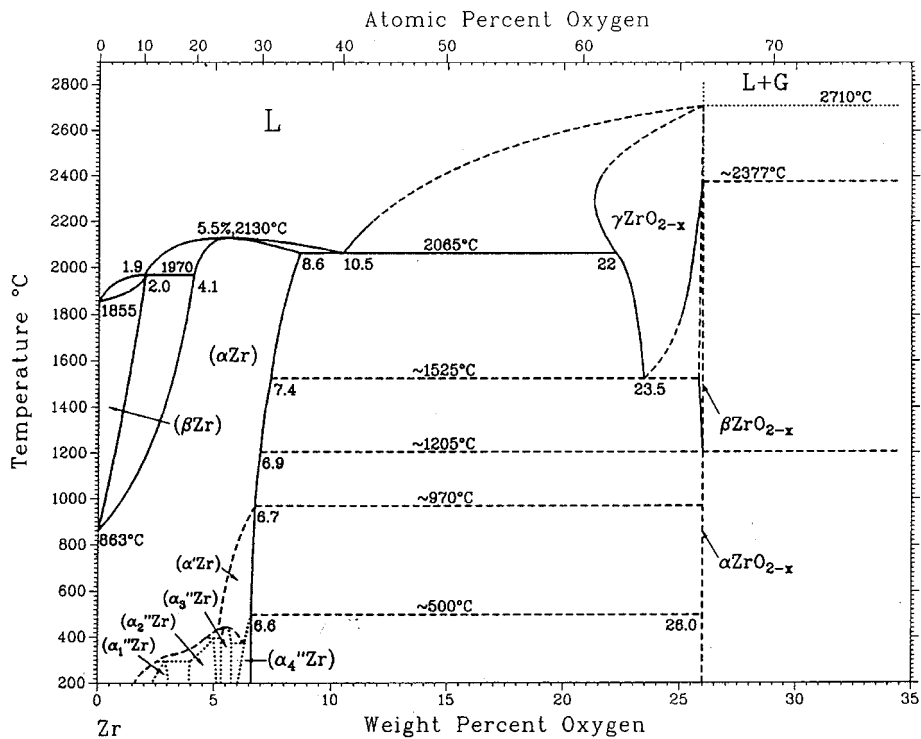
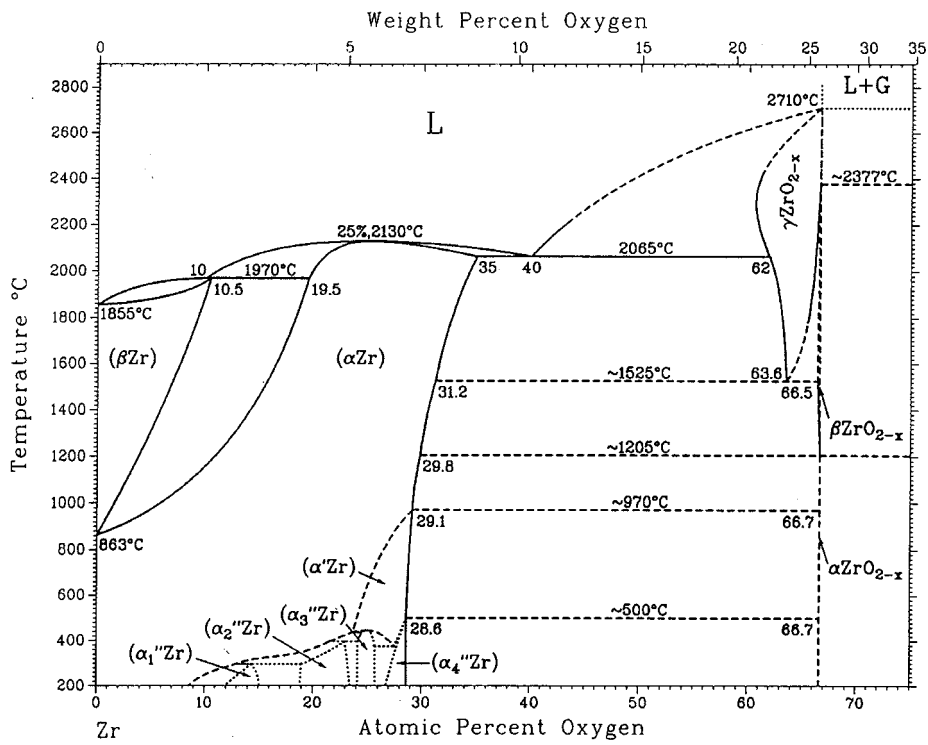


Fig. 4-5 Zr-O 之二元相圖。