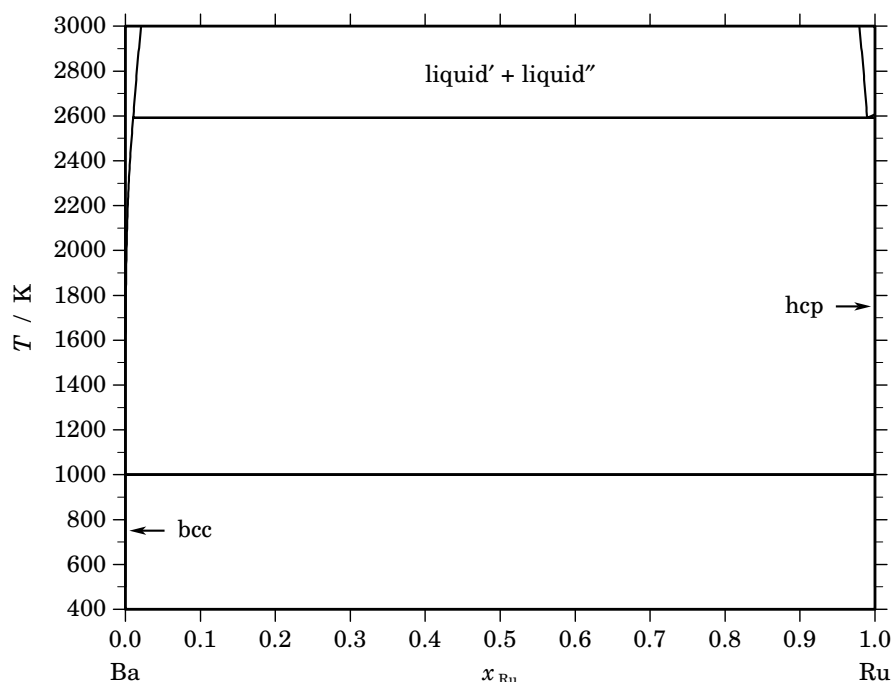


**Ba – Ru** (Barium – Ruthenium)**Fig. 1.** Calculated phase diagram for the system Ba-Ru.

The Ba-Ru binary system contains two components of interest in the nuclear field, selected as representative of families of non volatile fission products. The classical compilations of binary phase diagrams, give no information at all on this system. Consequently, it has been supposed that there is a negligible mutual solubility of the elements barium and ruthenium in the solid state, and a wide miscibility gap in the liquid state, the mutual solubility increasing at high temperature. Thus, the assessed diagram is only qualitative, and solubilities may only be estimated. No thermodynamic properties are available for that system. The system was assessed by Chevalier and Fischer [1995Che]. The excess Gibbs energy of the liquid was estimated to be highly positive, to produce a small mutual solubility of pure components at low temperature and a large miscibility gap at high temperature. Similarly, highly positive interaction parameters in the bcc and hcp phases allow to produce a negligible mutual solubility of the components. No experimental data are available for comparison with the calculated phase diagram.

**Table I.** Phases, structures and models.

Phase	Strukturbericht	Prototype	Pearson symbol	Space group	SGTE name	Model
liquid					LIQUID	(Ba,Ru) <sub>1</sub>
bcc	A2	W	<i>cI2</i>	<i>Im<math>\bar{3}m</math></i>	BCC_A2	(Ba,Ru) <sub>1</sub>
hcp	A3	Mg	<i>hP2</i>	<i>P6<sub>3</sub>/mmc</i>	HCP_A3	(Ba,Ru) <sub>1</sub>

**Table II.** Invariant reactions.

Reaction	Type	<i>T</i> / K	Compositions / <i>x</i> <sub>Ru</sub>			$\Delta_r H$ / (J/mol)
liquid'' $\rightleftharpoons$ liquid' + hcp	eutectic	2592.3	0.989	0.011	1.000	–39195
liquid' $\rightleftharpoons$ bcc + hcp	eutectic	1000.0	0.000	0.000	1.000	–7120

**References**

[1995Che] P.-Y. Chevalier, E. Fischer, unpublished work, 1995.