Table S1 Compilation of the thermodynamic data used in the model calculations.

	$\Delta_f H^0_{298}$/ kJ·mol^{-1}	S^0_{298}/ J·mol^{-1}·K^{-1}	C^0_p /J·mol^{-1}·K^{-1} = $a + b\cdot10^{-3}\cdot T + c\cdot10^{6}\cdot T^{-2} + d\cdot10^{-6}\cdot T^{2}$				reference
			a	*b*	*c*	*d*	
B(s)	0	5.8	18.87	8.17	-0.93	-1.36	[1]
B(g)	560.0	153.4	28.8	-	-	-	[1]
B_2(g)	829.7	202.0	31.6	-	-	-	[1]
BBr(g)	234.0	225.0	36.21	1.15	-0.34	-	[1]
BBr_3(g)	-204.2	324.3	80.38	1.44	-1.19	-	[1]
Br(g)	111.9	175.0	19.87	1.49	0.04	-	[1]
Br_2(g)	32.2	249.4	37.03	0.88	-0.11	-	[1]
Co(s)	0	30.1	19.13	20.47	-4.68	-	[1]
$CoBr_2$(g)	0.3	321.1	67.57	0	-0.39	-	$\Delta_f H^0$ calculated on basis of [2], S^0 and C^0_p from $NiBr_2$(g) [1]
Co_2B(s)	-125.5	59.8	60	-	-	-	[1]
CoB(s)	-94.1	30.5	34.6	-	-	-	[1]

Calculation of $\Delta_f H^0_{298}(CoBr_2(g))$:

$CoBr_2(s) \rightleftarrows CoBr_2(g)$ $\Delta_{subl} H^0$ = 216 kJ·mol^{-1} [2]

$\Delta_{subl} H^0_{298} = \Delta_f H^0_{298}(CoBr_2(g)) - \Delta_f H^0_{298}(CoBr_2(s))$

$\Delta_f H^0_{298}(CoBr_2(s))$ = -215.7 kJ·mol^{-1} [1]

$\Delta_f H^0_{298}(CoBr_2(g))$ = 216 kJ·mol^{-1} + (-215.7 kJ·mol^{-1}) = 0.3 kJ·mol^{-1}

[1] M. Binnewies, E. Milke, *Thermochemical Data of Elements and Compounds*, Wiley, VCH, Weinheim, 2nd Ed. 2002.
[2] G. Bardi, B. Brunetti, E. Ciccariello, V. Piacente, *J. Alloy. Compd.*, 1997, **247**, 202.