**Phase-selection Prediction and Component Determination of Multiple-principal Amorphous Alloy Composites Based on Artificial Neural Network Model(Supplementary materials)**

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In Table 1, the expressions of three parameters (*δ*, Δ*χ* and *S*id) are,

 (1)

 (2)

 (3)

Where *a* is the average atomic radius; *ri* is the atomic radius of the *i*th element; *Ci* is the atomic fraction of the *i*th element; *χi* is the electronegativity of the *i*th element; *χ* is the average electronegativity.

Table 1 Four characteristic parameter (*δ*, ∆*χ* and *S*id) values and phases of 330 alloys.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Alloys | *δ* | ∆*χ* | *S*id | phase |
| Cu0.5NiAlCoCrFeSi[1] | 6.35 | 0.12 | 16.01 | AM |
| Zr17Ta16Ti19Nb22Si26[2] | 11.08 | 0.20 | 13.25 | AM |
| Cu50Zr50[3] | 11.27 | 0.29 | 5.76 | AM |
| Ni50Nb50[4] | 6.84 | 0.16 | 5.76 | AM |
| PdPtCuNiP[5] | 9.29 | 0.16 | 13.38 | AM |
| SrCaYbMgZn[6] | 15.25 | 0.26 | 13.38 | AM |
| SrCaYbMgZnCu[7] | 18.14 | 0.35 | 14.90 | AM |
| SrCaYbLi0.55Mg0.45Zn[7] | 15.71 | 0.26 | 14.53 | AM |
| ErTbDyNiAl[7] | 13.74 | 0.30 | 13.38 | AM |
| AlCrTaTiZr[8] | 7.85 | 0.11 | 13.38 | AM |
| CuNbNiTiZr[9] | 9.25 | 0.22 | 13.38 | AM |
| Pd75Si25[10] | 7.29 | 0.13 | 4.68 | AM |
| Mg50Cu50[11] | 11.22 | 0.30 | 5.76 | AM |
| Zr50Ni50[12] | 12.52 | 0.29 | 5.76 | AM |
| Mg50Ni50[13] | 12.47 | 0.30 | 5.76 | AM |
| ZrHfTiCuNi[14] | 10.33 | 0.27 | 13.38 | AM |
| ZrHfTiCuFe[14] | 10.43 | 0.25 | 13.38 | AM |
| ZrHfTiCuCo[14] | 10.23 | 0.26 | 13.38 | AM |
| Cu0.5NiAlCoCrFeTi[15] | 6.98 | 0.14 | 16.01 | AM |
| Cu0.5NiAlCoCrFe[16] | 5.50 | 0.12 | 14.7 | AM |
| AlCrMoSiTi[17] | 8.68 | 0.23 | 13.38 | AM |
| AlCrMoTaTiZr[18] | 7.46 | 0.26 | 14.9 | AM |
| AlMoNbSiTaTiVZr[19] | 8.65 | 0.24 | 17.3 | AM |
| Zr41.2Ti13.8Cu12.5Ni10Be22.5[10] | 13.98 | 0.22 | 12.18 | AM |
| Pd40Cu30Ni10P20[20] | 9.08 | 0.14 | 10.64 | AM |
| Fe41Co7Cr15Mo14C15B6Y2[20] | 18.56 | 0.30 | 13.66 | AM |
| Mg54Cu26.5Ag8.5Gd11[20] | 11.02 | 0.30 | 9.45 | AM |
| Cu46Zr42Al7Y5[21] | 11.85 | 0.28 | 8.79 | AM |
| Y36Sc20Al24Co20[20] | 13.55 | 0.25 | 11.26 | AM |
| Co48Cr15Mo14C15B6Er2[20] | 18.40 | 0.29 | 12 | AM |
| Ti40Zr25Cu12Ni3Be20[22] | 12.17 | 0.18 | 11.60 | AM |
| Pt42.5Cu27Ni9.5P21[20] | 9.64 | 0.17 | 10.55 | AM |
| Ca65Mg15Zn20[20] | 13.45 | 0.26 | 7.37 | AM |
| Ca40Mg30Cu30[23] | 17.60 | 0.37 | 9.05 | AM |
| Ca45Cu36Mg19[23] | 18.94 | 0.40 | 8.67 | AM |
| Ca47Cu27Mg19Zn7[24] | 18.07 | 0.38 | 10.06 | AM |
| Ca50Cu25Mg15Zn10[24] | 18.10 | 0.38 | 10.04 | AM |
| Ca50Cu25Zn15Mg10[24] | 18.57 | 0.39 | 10.04 | AM |
| Ca50Cu30Mg20[23] | 18.07 | 0.39 | 8.56 | AM |
| Ca50Mg25Zn15Cu10[24] | 15.52 | 0.31 | 10.04 | AM |
| Ca53Cu24Mg23[23] | 16.92 | 0.37 | 8.46 | AM |
| Ca55Cu25Mg20[23] | 17.15 | 0.37 | 8.29 | AM |
| Ca55Cu35Mg10[23] | 19.14 | 0.42 | 7.70 | AM |
| Ca55Mg25Zn20[24] | 13.71 | 0.26 | 8.29 | AM |
| Ca55Zn27Mg18[24] | 14.68 | 0.28 | 8.24 | AM |
| Ca58Cu24Mg18[23] | 16.94 | 0.37 | 8.04 | AM |
| Ca60Mg20Cu20[23] | 16.01 | 0.35 | 7.90 | AM |
| Ca60Mg25Cu15[23] | 14.76 | 0.32 | 7.80 | AM |
| Ca60Zn22.5Mg17.5[24] | 13.99 | 0.27 | 7.87 | AM |
| Ca60Zn30Mg10[24] | 15.05 | 0.29 | 7.47 | AM |
| Ca63Al32Cu5[24] | 15.54 | 0.32 | 6.70 | AM |
| Ca65Cu25Mg10[23] | 17.09 | 0.38 | 7.12 | AM |
| Ca65Mg20Cu15[23] | 14.61 | 0.32 | 7.37 | AM |
| Ca65Mg25Cu10[23] | 13.19 | 0.28 | 7.12 | AM |
| Mg65Cu25Dy10[24] | 10.29 | 0.26 | 7.12 | AM |
| Mg65Cu25Gd10[24] | 10.55 | 0.26 | 7.12 | AM |
| Mg65Cu25Ho10[24] | 10.22 | 0.26 | 7.12 | AM |
| Mg65Cu25Pr10[24] | 9.40 | 0.27 | 7.12 | AM |
| Mg68Ni15Gd10Ag7[25] | 9.67 | 0.26 | 8.01 | AM |
| Mg69Ni15Gd10Ag6[25] | 9.64 | 0.25 | 7.81 | AM |
| Mg70La17Ni13[25] | 10.72 | 0.23 | 6.79 | AM |
| Mg70Ni15Nd15[23] | 8.36 | 0.23 | 6.81 | AM |
| Mg71Ni18La11[25] | 11.06 | 0.25 | 6.61 | AM |
| Mg75Ni15Gd10[25] | 9.42 | 0.22 | 6.07 | AM |
| Mg80Ni10Nd10[23] | 6.91 | 0.19 | 5.31 | AM |
| Ni42Zr25Ti20Al8Cu5[24] | 10.58 | 0.24 | 11.51 | AM |
| Ni59Zr20Ti16Si5[24] | 11.27 | 0.24 | 8.95 | AM |
| Ni60Nb25Zr15[24] | 9.86 | 0.22 | 7.80 | AM |
| Ni60Nb30Zr10[24] | 9.03 | 0.20 | 7.47 | AM |
| Ni60Zr20Ti5Nb10Al5[26] | 10.64 | 0.24 | 9.63 | AM |
| Ni61Zr22Nb7Al4Ta6[26] | 10.86 | 0.24 | 9.30 | AM |
| Pd77Si17Cu6[27] | 6.30 | 0.13 | 5.58 | AM |
| Pr68Cu25Al7[27] | 10.50 | 0.34 | 6.61 | AM |
| Pd40Ni40P20[23] | 9.17 | 0.14 | 8.77 | AM |
| Ti40Cu32Pd18Zr10[23] | 7.32 | 0.28 | 10.56 | AM |
| Ti40Cu36Pd14Zr10[23] | 7.53 | 0.27 | 10.31 | AM |
| Ti40Cu40Pd10Zr10[23] | 7.73 | 0.25 | 9.92 | AM |
| Ti50Be18Zr15Cu9Ni8[28] | 11.27 | 0.17 | 11.30 | AM |
| Ti50Cu32Ni30Sn3[28] | 7.91 | 0.18 | 9.68 | AM |
| Ti50Ni24Cu20Sn3Si2B1[24] | 9.10 | 0.19 | 10.31 | AM |
| Zr42Cu36Al8Ag8Au6[25] | 9.86 | 0.34 | 10.85 | AM |
| Zr42Cu36Al8Ag8Hf6[25] | 10.03 | 0.28 | 10.85 | AM |
| Zr42Cu36Al8Ag8Ni6[25] | 10.50 | 0.28 | 10.85 | AM |
| Zr42Cu36Al8Ag8Ti6[25] | 9.86 | 0.27 | 10.85 | AM |
| Zr44Cu36Al8Ag8Fe4[25] | 10.41 | 0.27 | 10.49 | AM |
| Zr44Cu36Al8Ag8Nb4[25] | 9.96 | 0.27 | 10.49 | AM |
| Zr44Cu36Al8Ag8Pd4[25] | 10.02 | 0.29 | 10.49 | AM |
| Zr44Cu40Ag8Al8[25] | 10.27 | 0.28 | 9.41 | AM |
| La55Al25Cu15Ag5[26] | 15.23 | 0.33 | 9.23 | AM |
| La55Al25Ni10Cu10[26] | 16.19 | 0.33 | 9.44 | AM |
| La55Al25Ni5Cu10Co5[25] | 16.17 | 0.33 | 10.02 | AM |
| La62Al14Cu12Ni12[24] | 16.42 | 0.35 | 8.98 | AM |
| La62Cu17Al14Ag7[24] | 15.08 | 0.35 | 8.81 | AM |
| La62Cu19Al14Ag5[24] | 15.36 | 0.35 | 8.62 | AM |
| La62Cu22Al14Ag2[24] | 15.77 | 0.35 | 8.17 | AM |
| Fe66B22W6Y6[25] | 19.93 | 0.22 | 7.86 | AM |
| Fe67B22Y6Mo5[29] | 19.89 | 0.19 | 7.65 | AM |
| Fe67B22Y6W5[29] | 19.90 | 0.21 | 7.65 | AM |
| Fe68B22Y6Co4[26] | 19.73 | 0.18 | 7.42 | AM |
| Fe68B22Y6Ni4[26] | 19.73 | 0.18 | 7.42 | AM |
| Fe71B22Y6Mo[29] | 19.76 | 0.18 | 6.58 | AM |
| Fe71B22Y6W[29] | 19.77 | 0.19 | 6.58 | AM |
| Fe62B22Co10Y6[26] | 19.74 | 0.18 | 8.55 | AM |
| Fe64B22Co8Y6[26] | 19.74 | 0.18 | 8.23 | AM |
| Fe68B22Y6Mo4[29] | 19.86 | 0.19 | 7.42 | AM |
| Fe68B22Y6W4[25] | 19.86 | 0.21 | 7.42 | AM |
| Fe69B22Y6Mo3[29] | 19.83 | 0.19 | 7.18 | AM |
| Mg65Ni20La15[25] | 12.06 | 0.27 | 7.37 | AM |
| Fe6NiCoSiCrAlTi[30] | 6.56 | 0.11 | 13.21 | SS |
| WNbMoTa[31] | 2.31 | 0.36 | 11.53 | SS |
| WNbMoTaV[31] | 3.15 | 0.34 | 13.38 | SS |
| FeCoNiCrCu[32] | 1.03 | 0.09 | 13.38 | SS |
| CoCr2FeNi[33] | 0.28 | 0.11 | 11.08 | SS |
| FeCoNiCrCuAl0.5[32] | 4.17 | 0.11 | 14.70 | SS |
| FeCoNiCrCuAl0.8[32] | 4.92 | 0.12 | 14.87 | SS |
| FeCoNiCrCuAl[32] | 5.28 | 0.12 | 14.90 | SS |
| FeCoNiCrCuAl1.5[32] | 5.89 | 0.12 | 14.79 | SS |
| FeCoNiCrCuAl2.0[32] | 6.26 | 0.13 | 14.53 | SS |
| FeCoNiCrCuAl2.3[32] | 6.40 | 0.13 | 14.35 | SS |
| FeCoNiCrCuAl2.8[32] | 6.57 | 0.13 | 14.01 | SS |
| FeCoNiCrCuAl3[32] | 6.61 | 0.13 | 13.86 | SS |
| CuNiCoFe[34] | 1.14 | 0.03 | 11.53 | SS |
| FeNi2CrCuAl0.4[35] | 3.86 | 0.11 | 12.45 | SS |
| FeNi2CrCuAl0.6[35] | 4.49 | 0.12 | 12.72 | SS |
| FeNi2CrCuAl0.8[35] | 4.96 | 0.12 | 12.88 | SS |
| FeNi2CrCuAl[35] | 5.32 | 0.12 | 12.98 | SS |
| FeNi2CrCuAl1.2[35] | 5.60 | 0.13 | 13.02 | SS |
| AlCo0.5CrCuFeNi[36] | 5.45 | 0.12 | 14.70 | SS |
| AlCoCr0.5CuFeNi[36] | 5.44 | 0.12 | 14.70 | SS |
| AlCoCrCu0.5FeNi[36] | 5.51 | 0.12 | 14.70 | SS |
| AlCoCrCuFe0.5Ni[36] | 5.40 | 0.12 | 14.70 | SS |
| AlCoCrCuFeNi0.5[36] | 5.43 | 0.12 | 14.70 | SS |
| CoCrMnNi[37] | 3.45 | 0.15 | 11.53 | SS |
| Al0.5CoCrCu0.5FeNi[38] | 4.37 | 0.11 | 14.53 | SS |
| Al0.5Co0.5Cu0.5Fe0.5Ni[39] | 5.30 | 0.11 | 12.98 | SS |
| Al1.5CoCrCu0.5FeNi[36] | 6.11 | 0.13 | 14.53 | SS |
| Al2CoCrCu0.5FeNi[36] | 6.46 | 0.13 | 14.23 | SS |
| AlCrCu0.5FeNi[36] | 5.92 | 0.12 | 13.15 | SS |
| AlCo0.5CrCu0.5FeNi[36] | 5.71 | 0.12 | 14.53 | SS |
| AlCoCuNi[40] | 5.85 | 0.12 | 11.53 | SS |
| AlCo1.5CrCu0.5FeNi[36] | 5.33 | 0.12 | 14.53 | SS |
| AlCo2CrCu0.5FeNi[36] | 5.17 | 0.12 | 14.23 | SS |
| AlCo3CrCu0.5FeNi[36] | 4.88 | 0.11 | 13.48 | SS |
| AlCo3.5CrCu0.5FeNi[36] | 4.75 | 0.11 | 13.09 | SS |
| AlCoCu0.5FeNi[38] | 5.90 | 0.11 | 13.15 | SS |
| AlCoCr0.5Cu0.5FeNi[36] | 5.70 | 0.12 | 14.53 | SS |
| AlCoCr1.5Cu0.5FeNi[36] | 5.34 | 0.12 | 14.53 | SS |
| AlCoCr2Cu0.5FeNi[36] | 5.18 | 0.12 | 14.23 | SS |
| AlCoCrCu0.5Ni[36] | 5.81 | 0.13 | 13.15 | SS |
| AlCoCrCu0.5Fe0.5Ni[38] | 5.66 | 0.13 | 14.53 | SS |
| AlNbTaV[41] | 3.53 | 0.05 | 11.53 | SS |
| AlCoCrCu0.5Fe1.5Ni[36] | 5.37 | 0.12 | 14.53 | SS |
| AlCoCrCu0.5Fe2Ni[38] | 5.23 | 0.11 | 14.23 | SS |
| AlCoCrCu0.5Fe[38] | 5.87 | 0.12 | 13.15 | SS |
| AlCoCrCu0.5FeNi0.5[36] | 5.68 | 0.12 | 14.53 | SS |
| NbTiVZr[42] | 7.04 | 0.12 | 11.53 | SS |
| AlCoCrCu0.5FeNi1.5[38] | 5.35 | 0.12 | 14.53 | SS |
| AlCoCrCu0.5FeNi2[38] | 5.20 | 0.12 | 14.23 | SS |
| AlCoCrCu0.5FeNi2.5[36] | 5.06 | 0.12 | 13.87 | SS |
| AlCoCrCu0.5FeNi3[38] | 4.93 | 0.12 | 13.48 | SS |
| CrCuFeMnNi[43] | 3.20 | 0.14 | 13.38 | SS |
| CoCrFeMnNi[44] | 3.27 | 0.14 | 13.38 | SS |
| TiZrNbMo[45] | 5.98 | 0.31 | 11.53 | SS |
| Al0.5CrCuFeMnNi[46] | 4.66 | 0.14 | 14.70 | SS |
| Al0.8CrCuFeMnNi[46] | 5.15 | 0.14 | 14.87 | SS |
| AlCrCuFeMnNi[43] | 5.39 | 0.14 | 14.90 | SS |
| Al0.8CrCu1.5FeMnNi[43] | 4.96 | 0.14 | 14.74 | SS |
| Al0.8CrCuFe1.5MnNi[43] | 5.08 | 0.14 | 14.74 | SS |
| Al0.8CrCuFeMn1.5Ni[43] | 5.05 | 0.15 | 14.74 | SS |
| HfNbTIZr[47] | 4.86 | 0.13 | 11.53 | SS |
| Al0.4Hf0.6TaNbZrTi[48] | 4.91 | 0.12 | 14.50 | SS |
| Fe89Zr5B6[49] | 10.60 | 0.12 | 3.51 | SS |
| Al0.7CoCrFeNi[50] | 5.18 | 0.12 | 13.31 | SS |
| Fe89Zr7B4[49] | 10.18 | 0.14 | 3.48 | SS |
| Fe91Hf7B2 [49] | 27.91 | 0.14 | 2.91 | SS |
| Al0.5MoNbTiV[51] | 3.93 | 0.24 | 13.15 | SS |
| AlCoCrFeNi[52] | 5.78 | 0.12 | 13.38 | SS |
| AlCoCrCuNi[40] | 5.52 | 0.13 | 13.38 | SS |
| Al2.5CoCrCuFeNi[44] | 6.48 | 0.13 | 14.21 | SS |
| AlCrFeMo0.5Ni[53] | 6.04 | 0.17 | 13.15 | SS |
| AlCoCrFeNiCu0.25[54] | 5.64 | 0.12 | 14.34 | SS |
| Al0.75CoCrFeNiCu0.25[54] | 5.17 | 0.12 | 14.32 | SS |
| NbTiV2Zr[42] | 7.47 | 0.11 | 11.08 | SS |
| Hf0.25Nb0.375TiV0.5Zr0.5[55] | 6.55 | 0.12 | 12.48 | SS |
| TaNbHfZrTi[56] | 4.99 | 0.12 | 13.38 | SS |
| CuNi[57] | 1.27 | 0.01 | 5.76 | SS |
| CoCrFeNi[58] | 0.30 | 0.10 | 11.53 | SS |
| CoCrCuFeNiTi0.5[59] | 4.82 | 0.12 | 14.70 | SS |
| CoFeNi2V0.5Nb0.4[60] | 4.14 | 0.11 | 12.07 | SS |
| CoFeNi2V0.5Nb0.75[60] | 5.06 | 0.12 | 12.48 | SS |
| CoFeNi2V0.5Nb[61] | 5.48 | 0.12 | 12.60 | SS |
| Al0.75CoFeNi[62] | 5.81 | 0.11 | 11.47 | SS |
| Al0.304Cr0.435Fe0.435Ni[63] | 5.09 | 0.12 | 10.61 | SS |
| AlCrCuFeNi[64] | 5.63 | 0.12 | 13.38 | SS |
| Al0.1CoCrFeMnNi[65] | 3.69 | 0.14 | 13.92 | SS |
| Al0.05Cr0.5FeMn0.625Ni0.375[66] | 3.98 | 0.13 | 11.56 | SS |
| Al0.333Co0.333Cu0.333Fe0.333Ni[67] | 5.03 | 0.10 | 12.26 | SS |
| Hf0.25Nb0.125TiV0.5Zr0.5[55] | 6.81 | 0.12 | 11.74 | SS |
| MoNbTaTi0.75W[68] | 2.69 | 0.36 | 13.33 | SS |
| AlCoCrFeNb0.1Ni[69] | 5.92 | 0.13 | 13.92 | SS |
| AlMoNbTi[70] | 2.54 | 0.25 | 11.53 | SS |
| AlMoTaTi[71] | 2.55 | 0.27 | 11.53 | SS |
| CoCrNi[57] | 0.16 | 0.11 | 9.13 | SS |
| CoCrFeNiN[72] | 17.32 | 0.50 | 13.38 | SS |
| MoNbRe0.5W[73] | 2.04 | 0.30 | 11.24 | SS |
| AlCrFeMo0.5NiTi0.6[74] | 6.91 | 0.17 | 14.61 | SS |
| CoCrFeNiW0.2[75] | 2.07 | 0.15 | 12.57 | SS |
| CrCo1.5Ni1.5[76] | 0.17 | 0.10 | 9.00 | SS |
| Al10Co17Fe34Mn5Ni34[77] | 4.65 | 0.11 | 11.76 | SS |
| Al35Cr35Mn8Mo5Ti17[78] | 6.52 | 0.13 | 11.54 | SS |
| MoNbTiV0.25Zr[79] | 6.30 | 0.30 | 12.71 | SS |
| FeCoCrNiAlTi[80] | 7.22 | 0.14 | 14.90 | SS |
| FeCoCrNiAlSi[81] | 6.61 | 0.12 | 14.90 | SS |
| FeCoCrAlCu[82] | 5.58 | 0.12 | 13.38 | SS |
| FeCoCrNiTiAl0.6[83] | 7.09 | 0.14 | 14.78 | SS |
| FeCoCrNiMo0.2[84] | 2.00 | 0.12 | 12.57 | SS |
| CoCrFeNiTi[85] | 6.68 | 0.14 | 13.38 | IM |
| NbCrFeMnCoNi[86] | 5.49 | 0.14 | 14.90 | IM |
| TiCrFeMnCoNi[86] | 6.29 | 0.15 | 14.90 | IM |
| TiVCrCuFeMnCoNi[87] | 5.50 | 0.15 | 17.29 | IM |
| Ti2CrCuFeCoN[88] | 7.24 | 0.15 | 14.53 | IM |
| AlTiVYZr[88] | 10.95 | 0.16 | 13.38 | IM |
| ZrTiVCuNiBe[88] | 11.49 | 0.20 | 14.90 | IM |
| CoCrCuFeNiTi0.8[89] | 5.70 | 0.13 | 14.87 | IM |
| CoCrCuFeNiTi[89] | 6.12 | 0.14 | 14.90 | IM |
| Al0.5CoCrCuFeNiTi0.8[90] | 6.26 | 0.14 | 16.00 | IM |
| Al0.5CoCrCuFeNiTi[90] | 6.53 | 0.14 | 16.01 | IM |
| Al0.5CoCrCuFeNiTi1.2[90] | 6.76 | 0.14 | 15.97 | IM |
| Al0.5CoCrCuFeNiTi1.4[90] | 6.94 | 0.15 | 15.91 | IM |
| Al0.5CoCrCuFeNiTi1.6[90] | 7.09 | 0.15 | 15.82 | IM |
| Al0.5CoCrCuFeNiTi2.0[90] | 7.31 | 0.15 | 15.60 | IM |
| Al0.5CoCrCuFeNiV0.6[91] | 4.09 | 0.12 | 15.93 | IM |
| Al0.5CoCrCuFeNiV0.8[91] | 4.06 | 0.12 | 16.00 | IM |
| Al0.5CoCrCuFeNiV[91] | 4.04 | 0.12 | 16.01 | IM |
| ZrHfTiAlCuNi[92] | 9.43 | 0.24 | 14.90 | IM |
| AlCoCrFeNiTi1.5[80] | 7.50 | 0.15 | 14.79 | IM |
| AlNbTiZr[93] | 4.80 | 0.11 | 11.53 | IM |
| Al40Mg40Li10Zn10[94] | 5.58 | 0.21 | 9.92 | IM |
| Al35Mg35Li15Zn15[94] | 5.54 | 0.23 | 10.84 | IM |
| Al15Li35Mg35Ca10Si5[95] | 10.94 | 0.27 | 11.64 | IM |
| Al15Li35Mg48CaSi[95] | 5.43 | 0.23 | 9.12 | IM |
| Al15Li38Mg45Ca0.5Si1.5[95] | 5.35 | 0.24 | 9.15 | IM |
| Al15Li39Mg45Ca0.5Si0.5[95] | 4.71 | 0.23 | 8.85 | IM |
| Al58.5Mg31.5Zn4.5Cu4.5Si[96] | 6.49 | 0.16 | 8.34 | IM |
| Al63Mg27Zn4.5Cu4.5Si[96] | 6.27 | 0.16 | 8.06 | IM |
| Al66.7Mg23.3Zn4.5Cu4.5Si[96] | 6.04 | 0.15 | 7.77 | IM |
| Al80Mg14Zn2.7Cu2.7Si0.6[96] | 4.81 | 0.12 | 5.65 | IM |
| FeSiBAlNiCo0.2[97] | 16.72 | 0.14 | 14.22 | IM |
| FeSiBAlNiCo0.8[97] | 15.84 | 0.13 | 14.87 | IM |
| AlNbTiVZr0.1[98] | 4.42 | 0.05 | 12.20 | IM |
| AlNbTiVZr0.25[98] | 4.96 | 0.07 | 12.71 | IM |
| AlNbTiVZr0.5[98] | 5.60 | 0.09 | 13.15 | IM |
| AlNbTiVZr[98] | 6.34 | 0.11 | 13.38 | IM |
| AlNbTiVZr1.5[98] | 6.71 | 0.12 | 13.25 | IM |
| Ti28Cu14Ni34.8Nb23.2[99] | 7.18 | 0.17 | 11.12 | IM |
| Ti30Cu15Ni33Nb22 [99] | 7.17 | 0.17 | 11.18 | IM |
| Ti32Cu16Ni31.2Nb20.8[99] | 7.16 | 0.17 | 11.21 | IM |
| Hf0.5Mo0.5NbTiZrB0.1[100] | 9.05 | 0.27 | 13.60 | IM |
| Hf0.5Mo0.5NbTiZrB0.3[100] | 13.14 | 0.28 | 14.17 | IM |
| Hf0.5Mo0.5NbTiZrB0.7[100] | 18.08 | 0.30 | 14.54 | IM |
| Hf0.5Mo0.5NbTiZrB0.9[100] | 19.81 | 0.30 | 14.55 | IM |
| CoNiFeAlTi[101] | 7.46 | 0.15 | 13.38 | IM |
| CrNbTiZrAl0.25[102] | 8.51 | 0.12 | 12.71 | IM |
| Al20Cr10Nb15Ti20V25Zr10 [103] | 6.81 | 0.09 | 14.43 | IM |
| Cr0.3Hf0.5Mo0.5NbTiZr[104] | 6.97 | 0.25 | 14.17 | IM |
| CoCrMoNbTi0.4[105] | 6.24 | 0.22 | 13.01 | IM |
| AlFeMgTiZn[106] | 8.13 | 0.17 | 13.38 | IM |
| AlLiMgZnSn[94] | 5.89 | 0.33 | 13.38 | IM |
| AlLi0.5MgZn0.5Cu0.5[94] | 7.38 | 0.28 | 12.89 | IM |
| Al80Li5Mg2Zn5Cu5[94] | 3.33 | 0.16 | 5.80 | IM |
| Al80Li5Mg2Zn5Sn5[94] | 3.54 | 0.17 | 5.80 | IM |
| Al1.0CrFeMnTi0.25[107] | 6.29 | 0.11 | 12.71 | IM |
| Al1.5CrFeMnTi [108] | 6.65 | 0.10 | 13.25 | IM |
| Al2.0CrFeMnTi [108] | 6.53 | 0.10 | 12.98 | IM |
| HfMo0.5NbSi0.3TiV0.5[109] | 7.88 | 0.25 | 14.17 | IM |
| AlNbTiZr0.1[93] | 2.22 | 0.05 | 10.02 | IM |
| AlNbTiZr0.25[93] | 3.12 | 0.07 | 10.69 | IM |
| AlNbTiZr0.5 [93] | 3.97 | 0.09 | 11.24 | IM |
| AlNbTiZr1.5[93] | 5.16 | 0.12 | 11.38 | IM |
| AlNbTiCr[93] | 6.04 | 0.04 | 11.53 | IM |
| AlNbTiVCr0.25[110] | 4.71 | 0.04 | 12.71 | IM |
| CoCrMoNb[111] | 5.79 | 0.22 | 11.53 | IM |
| CoCrMoNbTi[111] | 6.53 | 0.23 | 13.38 | IM |
| CoCrMoNbTi0.2[111] | 6.05 | 0.22 | 12.57 | IM |
| CoCrMoNbTi0.5[111] | 6.31 | 0.23 | 13.15 | IM |
| CrHfNbTiZr[112] | 8.62 | 0.14 | 13.38 | IM |
| CrNbTiVZr[42] | 8.67 | 0.12 | 13.38 | IM |
| CrTaTi0.17VW[113] | 5.16 | 0.33 | 12.47 | IM |
| CrTaTi0.3VW[113] | 5.28 | 0.33 | 12.83 | IM |
| CrTaVW[113] | 4.96 | 0.34 | 11.53 | IM |
| Al0.111CuMnNi[114] | 3.86 | 0.17 | 10.09 | IM |
| NbCrZrTi[42] | 8.77 | 0.12 | 11.53 | IM |
| Hf0.5Mo0.5NbSi0.1TiZr[115] | 6.68 | 0.26 | 13.60 | IM |
| Hf0.5Mo0.5NbSi0.9TiZr[115] | 10.63 | 0.27 | 14.55 | IM |
| Hf0.5Mo0.5NbSi0.3TiZr[115] | 8.12 | 0.27 | 14.17 | IM |
| Hf0.5Mo0.5NbSi0.5TiZr[115] | 9.17 | 0.27 | 14.43 | IM |
| Hf0.5Mo0.5NbSi0.7TiZr[115] | 9.98 | 0.27 | 14.54 | IM |
| HfMo0.5NbSi0.5TiV0.5[109] | 8.76 | 0.26 | 14.43 | IM |
| Mo0.5NbVCrTi[116] | 5.92 | 0.18 | 13.15 | IM |
| Mo0.5NbVCr1.5Ti [116] | 6.21 | 0.17 | 12.95 | IM |
| Mo0.5NbVCr2.0Ti[116] | 6.36 | 0.16 | 12.60 | IM |
| WTaMoNbVCr[117] | 4.65 | 0.32 | 14.90 | IM |
| MoNbCrTi0.4 [105] | 5.81 | 0.25 | 11.07 | IM |
| MoSi2[118] | 8.09 | 0.12 | 5.29 | IM |
| NbTiZrVMo[119] | 6.84 | 0.27 | 13.38 | IM |
| HfMo0.5NbSi0.7TiV0.5[109] | 9.44 | 0.26 | 14.54 | IM |
| NbTiZrVAl0.24[119] | 6.85 | 0.12 | 12.68 | IM |
| Al4CrFeMnTi0.25[120] | 6.01 | 0.08 | 10.51 | IM |
| Al3CrFeMnTi0.25[120] | 6.22 | 0.09 | 11.31 | IM |
| AlC0.3CoCrFeNi [121] | 11.02 | 0.21 | 14.43 | IM |
| Al1.5NbTiVZr[122] | 6.06 | 0.11 | 13.25 | IM |
| CrFe[123] | 0.32 | 0.09 | 5.76 | IM |
| AlCr1.5NbTiV[124] | 6.29 | 0.04 | 13.25 | IM |
| AlCrNbTiV[31] | 5.90 | 0.04 | 13.38 | IM |
| CrMoNbTiVWZr[125] | 7.55 | 0.34 | 16.18 | IM |
| Cr0.3MoNbTiZr0.3[125] | 5.74 | 0.28 | 12.32 | IM |
| Cr0.3MoNbTiV0.6Zr0.3[125] | 5.95 | 0.26 | 13.97 | IM |
| Al12.5Cr25Nb25Ti25Zr12.5[126] | 7.72 | 0.10 | 12.97 | IM |
| Al12Cr24Mo4Nb24Ti24Zr12[126] | 7.61 | 0.15 | 13.84 | IM |
| Al11.5Cr23Mo8Nb23Ti23Zr11.5[126] | 7.49 | 0.19 | 14.25 | IM |
| AlC0.4CoCrFeNi[121] | 12.17 | 0.23 | 14.6 | IM |
| CrMo0.5NbTa0.5TiZr[127] | 8.03 | 0.22 | 14.53 | IM |
| AlC0.5CoCrFeNi[121] | 13.17 | 0.25 | 14.70 | IM |

Table 2 Four characteristic parameter (*δ*, ∆*χ*, ∆*H*m and *S*id) values and phases of 30 amorphous alloys.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Alloys | *δ* | ∆*χ* | *S*id | phase |
| [(Co0.7Fe0.3)0.75B0.2Si0.05]96Nb4 [26] | 14.97 | 0.09 | 10.54 | AM |
| [(Co0.9Fe0.1)0.75B0.2Si0.05]96Nb4 [26] | 15.01 | 0.09 | 8.83 | AM |
| [(Co0.6Fe0.4)0.75B0.2Si0.05]96Nb4 [26] | 14.96 | 0.09 | 10.91 | AM |
| [(Co0.8Fe0.2)0.75B0.2Si0.05]96Nb4 [26] | 14.99 | 0.09 | 9.88 | AM |
| (Cu0.6Hf0.25Ti0.15)98Nb2 [24] | 9.37 | 0.26 | 8.46 | AM |
| (Cu0.6Hf0.25Ti0.15)96Nb4 [24] | 9.28 | 0.26 | 8.88 | AM |
| (Cu0.6Hf0.25Ti0.15)94Nb6[24] | 9.19 | 0.25 | 9.22 | AM |
| (Cu0.6Hf0.25Ti0.15)92Nb8 [24] | 9.09 | 0.25 | 9.49 | AM |
| Fe36Co36B19.2Si4.8Nb4[25] | 14.94 | 0.09 | 11.03 | AM |
| [(Fe0.5Co0.5)0.75B0.2Si0.05]96Nb4 [128] | 14.94 | 0.09 | 11.03 | AM |
| Fe56.8B24Co14.2Nb5 [25] | 16.53 | 0.12 | 9.07 | AM |
| [(Fe0.6Co0.4)0.75B0.2Si0.05]96Nb4 [26] | 14.92 | 0.10 | 10.91 | AM |
| [(Fe0.7Co0.3)0.75B0.2Si0.05]96Nb4 [25] | 14.90 | 0.10 | 10.54 | AM |
| Fe72B20Nb4Si4 [24] | 15.11 | 0.10 | 6.78 | AM |
| Fe55.8B24Co14.2Nb6 [25] | 16.66 | 0.11 | 9.26 | AM |
| (Fe0.75B0.15Si0.1)98Nb2[26] | 12.94 | 0.08 | 6.77 | AM |
| (Fe0.8Co0.2)71B23Nb6 [25] | 16.36 | 0.11 | 9.19 | AM |
| Fe75.71B14.29Si7.14Zr2.86 [129] | 13.73 | 0.12 | 6.48 | AM |
| Fe73B20Nb4Hf3 [129] | 16.12 | 0.14 | 6.53 | AM |
| Fe72.8B16Si8Zr3.2 [129] | 14.51 | 0.12 | 6.96 | AM |
| Zr48Be18Cu14Ni12Nb8 [24] | 13.74 | 0.24 | 11.58 | AM |
| Zr48Be24Cu12Fe8Nb8 [24] | 14.44 | 0.21 | 11.25 | AM |
| Fe67B22Y6Mo5 [29] | 19.89 | 0.19 | 7.65 | AM |
| (Fe0.75B0.15Si0.1)99Nb1 [26] | 12.84 | 0.08 | 6.48 | AM |
| Ni42Zr20.5Ti20Al8Cu5Si4.5 [24] | 10.80 | 0.24 | 12.49 | AM |
| Ni42Zr22.5Ti19Al8Cu5Si3.5 [24] | 10.86 | 0.24 | 12.34 | AM |
| Ni59Zr20Ti16Si5 [24] | 11.27 | 0.24 | 8.95 | AM |
| Ni42Zr21.5Ti20Al8Cu5Si3.5 [24] | 10.77 | 0.24 | 12.35 | AM |
| (Ni0.75B0.2Si0.05)96Nb4 [26] | 14.84 | 0.08 | 6.88 | AM |
| [(Ni0.9Fe0.1)0.75B0.2Si0.05]96Nb4 [26] | 14.84 | 0.09 | 8.83 | AM |

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