Constructing Redox Tables

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Questions**

1. Write the reduction half reaction table that fits the following spontaneity evidence. (“✓” = spontaneous, “–“ = non-spontaneous)

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Fe2+(aq) | Pb2+(aq) | Sn2+(aq) | Cr2+(aq) |
| Fe(s) | – | ✓ | ✓ | – |
| Pb(s) | – | – | – | – |
| Sn(s) | – | ✓ | – | – |
| Cr(s) | ✓ | ✓ | ✓ | – |

2. Write the reduction half reaction table that fits the following spontaneity evidence.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Cd2+(aq) | V2+(aq) | Ra2+(aq) | Be2+(aq) |
| Be(s) | ✓ | ✓ | – | – |
| Ra(s) | ✓ | ✓ | – | ✓ |
| V(s) | ✓ | – | – | – |
| Cd(s) | – | – | – | – |

3. Write the reduction half reaction table that fits the following spontaneity evidence.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Ga3+(aq) | In3+(aq) | Al3+(aq) | Tl+(aq) |
| Ga(s) | – | ✓ | – | ✓ |
| Al(s) | ✓ | ✓ | – | ✓ |
| In(s) | – | – | – | ✓ |
| Tl(s) | – | – | – | – |

4. Write the reduction half reaction table that fits the following spontaneity evidence.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Mn2+(aq) | Pr3+(aq) | Tl+(aq) | Ru2+(aq) |
| Pr4+(aq) | ✓ | – | ✓ | ✓ |
| Mn3+(aq) | – | – | ✓ | ✓ |
| Ru3+(aq) | – | – | ✓ | – |
| Tl3+(aq) | – | – | – | – |

5. Write the reduction half reaction table that fits the following spontaneity evidence.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Te4+(aq) | Nb3+(aq) | Sc3+(aq) | Ru3+(aq) |
| Te(s) | – | – | – | – |
| Ru2+(aq) | ✓ | – | – | – |
| Nb(s) | ✓ | – | – | ✓ |
| Sc(s) | ✓ | ✓ | – | ✓ |

6. Write the reduction half reaction table that fits the following spontaneity evidence.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Cl–(aq) | Ti2+(aq) | Te2–(aq) | Se2–(aq) |
| Cl2(g) | – | ✓ | ✓ | ✓ |
| Ti3+(aq) | – | – | ✓ | ✓ |
| Se(s) | – | – | ✓ | – |
| Te(s) | – | – | – | – |

7. Construct a table of half reactions from the following experimental evidence.

Co2+(aq) + Zn(s) 🡪 Co(s) + Zn2+(aq)

Mg2+(aq) + Zn(s) 🡪 **no evidence of reaction**

8. Construct a table of half reactions from the following experimental evidence.

3 Cd2+(aq) + 2 Ga(s) 🡪 3 Cd(s) + 2 Ga3+(aq)

 Mn2+(aq) + Ga(s) 🡪 **no evidence of reaction**

3 Mn2+(aq) + 2 Ce(s) 🡪 3 Mn(s) + 2 Ce3+(aq)

9. Construct a table of half reactions from the following experimental evidence.

2 Ce3+(aq) + 3 Sr(s) 🡪 2 Ce(s) + 3 Sr2+(aq)

 2 Ce3+(aq) + 3 Ni(s) 🡪 **no evidence of reaction**

 2 H+(aq) + Ni(s) 🡪 H2(g) + Ni2+(aq)

 4 H+(aq) + Pt(s) 🡪 **no evidence of reaction**

10. Construct a table of half reactions from the following experimental evidence.

Ca2+(aq) + Be(s) 🡪 **no evidence of reaction**

2 H+(aq) + Cu(s) 🡪 **no evidence of reaction**

Cd2+(aq) + Be(s) 🡪 Cd(s) + Be2+(aq)

 2 H+(aq) + Cd(s) 🡪 H2(g) + Cd2+(aq)

11. Construct a table of half reactions from the following experimental evidence.

Pb2+(aq) + 2 I–(aq) 🡪 PbI2(s)

 2 Ag(s) + I2(s) 🡪 **no evidence of reaction**

 2 Ag(s) + Br2(l) 🡪 2AgBr(s)

 Br2(l) + 2 Cl–(aq) 🡪 **no evidence of reaction**

12. Construct a table of half reactions from the following experimental evidence.

Sm2+(aq) + Pr(s) 🡪 **no evidence of reaction**

Pr3+(aq) + Gd(s) 🡪 **no evidence of reaction**

Gd3+(aq) + Sc(s) 🡪 **no evidence of reaction**

13. Construct a table of half reactions from the following experimental evidence.

2 In(s) + 3 Hg2+(aq) 🡪 3 Hg(l) + 2 In3+(aq)

 In(s) + Fe2+(aq) 🡪 **no evidence of reaction**

3 Fe2+(aq) + 2 Ce(s) 🡪 3 Fe(s) + 2 Ce3+(aq)

14. Construct a table of half reactions from the following experimental evidence.

Pr4+(aq) + Mn2+(aq) 🡪 Pr3+(aq) + Mn3+(aq)

 Pt2+(aq) + 2 Cl–(aq) 🡪 **no evidence of reaction**

2 Mn3+(aq) + 2 Cl–(aq) 🡪 Cl2(g) + 2 Mn2+(aq)