

A table of hybrid minerals

Most students learn that minerals can be categorized according to their anions as oxides, sulfides, chlorides, carbonates, sulfates, etc. This table shows that there are also hybrid minerals with anions from more than one of these categories. The most familiar example shown here is chlorapatite, a hybrid of the phosphate and chloride groups. More striking might be bradleyite (Na₃MgCO₃PO₄), a mineral that bridges the seemingly distinct carbonate and phosphate categories.

Borates	Pertsevite Mg ₂ BO ₃ F	Bandyite CuB(OH) ₄ Cl						
Carbonates	Brenkite Ca ₂ CO ₃ F ₂	Phosgenite Pb ₂ CO ₃ Cl ₂	Gaudfroyite Ca ₄ Mn ³⁺ _{3-x} (BO ₃) ₃ CO ₃ (O,OH) ₃					
Silicates	Taeniolite KLiMg ₂ Si ₄ O ₁₀ F ₂	Assisite Pb ₇ SiO ₈ Cl ₂	Datolite CaBSiO ₄ OH	Tilleyite Ca ₅ Si ₂ O ₇ (CO ₃) ₂				
Phosphates	Lacroixite NaAlPO ₄ F	Clorapatite Ca ₅ (PO ₄) ₃ Cl	Lünebergite Mg ₃ B ₂ (PO ₄) ₂ (OH) ₆ ·6H ₂ O	Bradleyite Na ₃ MgPO ₄ CO ₃	Clinophosinaite Na ₃ CaPO ₄ SiO ₃			
Sulfates	Kogarkoite Na ₃ SO ₄ F	Chlorothionite K ₂ CuSO ₄ Cl ₂	Sulfoborite Mg ₃ B ₂ SO ₄ (OH) ₈ (OH,F) ₂	Burkeite Na ₆ CO ₃ (SO ₄) ₂	Nosean Na ₈ Al ₆ Si ₆ O ₂₄ SO ₄	Svanbergite SrAl ₃ PO ₄ SO ₄ (OH) ₆		
Nitrates		Sveite KAl ₇ (NO ₃) ₄ Cl ₂ (OH) ₁₆ ·8H ₂ O					Darapskite Na ₃ NO ₃ SO ₄ ·H ₂ O	
Vanadates		Vanadinite Pb ₅ (VO ₄) ₃ Cl			Kurumsakite (Zn,Ni,Cu) ₈ Al ₈ V ₂ Si ₅ O ₃₅ ·27H ₂ O			Cassedannite Pb ₅ (VO ₄) ₂ (CrO ₄) ₂ ·H ₂ O
Chromates					Macquartite Pb ₃ CuCrO ₄ SiO ₃ (OH) ₄ ·2H ₂ O	Vauquelinite Pb ₂ CuCrO ₄ PO ₄ OH		
Niobates					Mongolite Ca ₄ Nb ₆ Si ₅ O ₂₄ (OH) ₁₀ ·nH ₂ O			Betpakdalite Ca ₂ MgFe ₃ (AsO ₄) ₂ Mo ₈ O ₂₈ (OH)·23H ₂ O
Molybdates						Melkovite CaFeH ₆ (MoO ₄) ₄ PO ₄ ·6H ₂ O		Rankachite CaFe ²⁺ V ₄ W ₈ O ₃₆ ·6H ₂ O
Tungstates		Pinaite Pb ₃ WO ₅ Cl ₂						
Arsenates	Maxwellite NaFeZn ₆ (AsO ₄)F	Mimetite Pb ₅ (AsO ₄) ₃ Cl	Cahnite Ca ₂ BAsO ₄ (OH) ₄		Kraisslite (Mn,Mg) ₂₄ Zn ₄ (AsO ₄) ₄ (SiO ₄) ₈ (OH) ₁₂	Lammerite Cu ₃ [(As,P)O ₄] ₂	Weilerite BaAl ₃ AsO ₄ SO ₄ (OH) ₆	Dugganite Pb ₃ Zn ₃ (TeO ₆) _x (AsO ₄) _{2-x} (OH) _{6-3x}
Selenates, Antimonates, & Tellurates		Tlalocite Cu ₁₀ Zn ₆ (TeO ₃) ₄ (TeO ₄) ₂ Cl (OH) ₂₅ ·27H ₂ O			Yeatmanite Mn ₉ Zn ₆ Sb ₂ Si ₄ O ₂₈	Kuksite Pb ₃ Zn ₃ TeO ₆ (PO ₄) ₂	Olsacherite Pb ₂ SO ₄ SeO ₄	Cheremnykhite Pb ₃ Zn ₃ (TeO ₆)(VO ₄) ₂
Iodates		Seeligerite Pb ₃ IO ₃ Cl ₃ O					Hectorfloresite Na ₉ IO ₃ (SO ₄) ₄	Dietzete Ca ₂ (IO ₃) ₂ CrO ₄
Arsenites	Nanlingite CaMg ₄ (AsO ₃) ₂ F ₄	Edkemite Pb ₆ As ₂ O ₇ Cl ₄				Tlapolite H ₆ (Ca,Pb) ₂ (Cu,Zn) ₃ SO ₄ (TeO ₃) ₄ TeO ₆		
Selenites		Sophiite Zn ₂ SeO ₃ Cl ₂						
Tellurites		Rodalquilarite H ₃ Fe ³⁺ ₂ (TeO ₃) ₄ Cl		Mroseite CaTeO ₂ CO ₃		Tlapolite H ₆ (Ca,Pb) ₂ (Cu,Zn) ₃ SO ₄ (TeO ₃) ₄ TeO ₆		
Oxides	Zaravitskite BiOF	Bismoclite BiOCl						
Sulfides		Corderoite Hg ₃ S ₂ Cl ₂			Helvine Mn ₄ Be ₃ (SiO ₄) ₃ S			
	Fluorides	Chlorides	Borates	Carbonates	Silicates	Phosphates	Sulfates	Other oxysalts

In addition to the hybrids shown here, there are oxysulfides, of which kermesite (Sb₂S₂O) is an example. This table largely focuses on hybrids with two anions, but there are also minerals with three anions, such as hanksite (Na₂₂K(SO₄)₉(CO₃)₂Cl) and chlorellestadite (Ca₁₀(SiO₄)₃(SO₄)₃Cl₂).