

## FOSS Chemical Interactions, Second Edition

### Glossary

**alchemy** the prescientific investigation of substances, including the search for ways to change common metals into gold (SRB)

**atmosphere** the layer of gases surrounding a planet (SRB)

**atom** the smallest particle of an element (SRB, IG)

**atomic number** the number assigned to an element, based on the number of protons in the nucleus of its atom (SRB)

**bioaccumulation** the process where a chemical is taken in by an organism due to consuming an organism that already has the chemical in its body (SRB)

**blood plasma** the clear, amber solution that is the liquid portion of blood (SRB)

**bond** an attractive force acting between atoms (SRB, IG)

**burning** a chemical reaction in which a substance reacts with oxygen to form a new product (IG)

**calorie** the unit of energy that will raise the temperature of 1 gram of water 1 degree Celsius (SRB, IG)

**carbohydrate** a group of carbon-based nutrients, including sugars and starches (SRB)

**carbon dioxide** a compound made of bonded carbon and oxygen atoms; CO<sub>2</sub> (SRB)

**chemical equation** a representation of a chemical reaction using chemical formulas (SRB)

**chemical formula** a code that represents the number and kinds of atoms in one particle of a substance (SRB, IG)

**chemical name** the name chemists use for a substance, which contains the names of the elements in that substance (IG)

**chemical property** a characteristic of a substance that determines how it interacts with other substances (SRB)

**chemical reaction** a process during which the atoms of starting substances (reactants) rearrange to form new substances (products) (SRB, IG)

**climate change** the change of worldwide average temperature and weather conditions (SRB)

**combustion** a chemical reaction, commonly called burning (SRB)

**common name** the name of a substance based on everyday language, such as baking soda or rubbing alcohol (IG)

**compound** a substance defined by a particle composed of two or more different kinds of atoms (SRB, IG)

**compressed** reduced in volume as a result of applied pressure (SRB, IG)

**compression** reducing the distance between particles by force (IG)

**concentrated** a solution with a large amount of solute dissolved in a small amount of solvent (SRB)

**concentration** the amount of solute dissolved in a measure of solvent (SRB, IG)

**condensation** the change of phase from gas to liquid (SRB, IG)

**conduction** the transfer of energy (heat) from one particle to another as a result of contact (SRB, IG)

**conservation of energy** an absolute principle stating that no energy is created or destroyed during energy transfers (IG)

**conservation of matter** principle stating that no matter is created or destroyed during a reaction (IG)

**conserved** unchanged (SRB)

**constraint** a restriction or limitation (SRB, IG)

**contract** to reduce the volume of a sample of matter as a result of cooling (IG)

**contraction** the reduction of volume of a sample of matter as a result of cooling (SRB)

**cooling** energy transfer that decreases the kinetic energy of particles (IG)

**core** the most dense, central layer of Earth, composed mostly of iron and nickel (SRB)

**criterion** requirement (SRB, IG)

**crude oil** a material made of mostly carbon and hydrogen; also known as petroleum (SRB)

**crust** Earth's hard outer layer of solid rock (SRB)

**crystal** the natural form of some solid substances. Crystal shape is also a physical property that helps to identify a substance. (IG)

**cyclotron** an instrument used to create new elements (SRB)

**density** the ratio of mass and volume in a sample of matter (SRB)

**deposit** the change of phase from gas directly to solid (SRB)

**deposition** when a material changes directly from a solid to a gas; oppose of sublimation (IG)

**dilute** a solution with a small amount of solute dissolved in a large amount of solvent (SRB)

**dissolve** to incorporate one substance uniformly into another substance at the particle level (SRB, IG)

**dry ice** the solid phase of carbon dioxide (SRB)

**electron** a subatomic particle with a negative charge (SRB)

**element** a fundamental substance that cannot be broken into simpler substances by chemical or physical processes (SRB, IG)

**energy transfer** the movement of energy from one location to another (SRB, IG)

**engineer** someone who comes up with ideas based on scientific findings to solve problems (SRB)

**engineering problem** the challenge that engineers seek to solve by identifying the design requirements and any limitations on their design (IG)

**equilibrium** a condition in which a system is experiencing no net change (SRB, IG)

**evaporation** the change of phase from liquid to gas (SRB, IG)

**exothermic reaction** chemical reaction that transfers energy to the environment in the forms of light, heat, and/or sound (SRB)

**expand** to increase in volume as a result of heating (IG)

**expansion** an increase of volume (SRB, IG)

**extinct** a group of organisms with no living members (SRB)

**force** a push or a pull (SRB)

**freeze** to change phase from liquid to solid (SRB, IG)

**freezing point** the temperature at which energy is flowing out of a substance, changing it from a liquid to a solid (IG)

**fundamental** simple and basic (SRB)

**gas** a phase of matter that has no definite shape or volume. Particles of gas fly independently through space. (SRB, IG)

**gaseous** existing in the gas phase (SRB)

**heat of fusion** heat that causes the solid/liquid phase change without changing the temperature of the substance (SRB)

**heating** energy transfer that increases the kinetic energy of particles (IG)

**herbicide** a plant poison (SRB)

**hydrocarbon** a group of carbon-based substances made of carbon and hydrogen only (SRB)

**insoluble** not capable of being dissolved. Sand is insoluble in water. (SRB)

**insulation** material that can reduce energy transfers (SRB, IG)

**ionic compound** a compound in which atoms are connected to each other with a weak network of bonds (ionic bonds) rather than covalent bonds (IG)

**kinetic energy** energy of motion (SRB, IG)

**lava** molten rock flowing on Earth's surface (SRB)

**limiting factor** the reactant that is present in the least amount in a reaction, which determines when the reaction stops (IG)

**lipid** a group of organic substances that includes oils, fats, and waxes (SRB)

**liquid** a phase of matter that has definite volume but no definite shape. Loosely bonded particles in liquid can flow over and around one another. (SRB, IG)

**mantle** the large rocky part of planet Earth, located between the core and the crust (SRB)

**mass** a measure of the quantity of matter (SRB)

**matter** anything that has mass and takes up space (SRB, IG)

**melt** to change phase from solid to liquid (SRB, IG)

**melting point** the temperature at which energy is flowing into a substance, changing it from a solid to a liquid (IG)

**metal** a group of elements that stretch, bend, and conduct heat and electricity (SRB)

**mixture** two or more substances together (SRB, IG)

**molecule** a particle made of two or more atoms that are held together with strong (covalent) bonds (SRB, IG)

**nitrogen** a colorless, odorless, gaseous element that makes up about 78 percent of Earth's atmosphere (SRB)

**noble gas** a gaseous element that does not react with other elements (SRB)

**nucleus** the center of an atom, composed of protons and neutrons (SRB)

**octane** an eight-carbon hydrocarbon molecule. Octane is one of the main ingredients in gasoline. (SRB)

**organic compound** a substance produced by an organism (SRB)

**oxidizer** a substance that provides an oxygen source for a combustion reaction (SRB)

**particle** the smallest piece of a substance that is still that substance (SRB, IG)

**periodic table of the elements** an organization of the elements based on chemical properties (SRB, IG)

**petroleum** a natural resource made of mostly carbon and hydrogen; also known as crude oil (SRB)

**phase** the physical condition of a sample of matter based on the kinetic energy of its particles. Common phases include solid, liquid, and gas. Also called state. (SRB)

**phase change** the process in which a substance changes state through energy transfer; the six processes are evaporation, condensation, melting, freezing, sublimation, and deposition (IG)

**physical property** a characteristic of a substance that can be observed without changing it chemically, such as size, shape, density, and phase (SRB)

**potash** an impure form of potassium carbonate (SRB)

**precipitate** an insoluble solid product of a reaction (SRB, IG)

**predict** to make an accurate estimation of a future event based on knowledge or pattern (SRB)

**product** a substance produced in a chemical reaction (SRB, IG)

**protein** very large organic molecules that contain nitrogen (SRB)

**proton** a subatomic particle that has a positive charge (SRB)

**pyrotechnics** a field of science that studies explosive exothermic chemical reactions like those used to create fireworks (SRB)

**radiation** a form of energy that travels through space (SRB)

**radioactivity** radiation given off by the elements (SRB)

**ratio** a mathematical relationship between two numbers (SRB)

**reactant** a starting substance in a chemical reaction (SRB, IG)

**room temperature** the average kinetic energy of the particles in the air and other objects in a typical comfortable room (SRB)

**scanning tunneling microscope** an instrument that can create images of arrays of atoms (SRB)

**solid** a phase of matter that has definite volume and definite shape. The particles of a solid are tightly bonded and cannot move around. (SRB, IG)

**solubility** the ability of a substance to dissolve in a solvent (IG)

**soluble** capable of being dissolved. Table salt is soluble in water. (SRB)

**solute** a substance that dissolves in a solvent to form a solution (SRB, IG)

**solution** a mixture formed when one substance dissolves in another (SRB, IG)

**solvent** a substance in which a solute dissolves to form a solution (SRB, IG)

**state of matter** the current phase of a substance, either a solid, liquid, or gas (IG)

**sublimation** to change phase from solid to gas (SRB, IG)

**substance** a type of matter defined by a unique particle (SRB, IG)

**symbol** a representation of an element using one or two letters (IG)

**synthetic** human-made (SRB)

**temperature** a measure of the average kinetic energy of the particles in a substance (IG)

**thermometer** an instrument used to measure the average kinetic energy of particles in a substance (IG)

**transparent** matter through which light can pass and an image can be seen clearly (SRB)

**vacuum** space containing no particles of air or anything else (SRB)

**vibrating** moving rapidly back and forth (SRB)

**volume** a defined quantity of space (SRB)

**water vapor** the gas phase of water (SRB)

**well-ordered array** a repeating pattern (SRB)