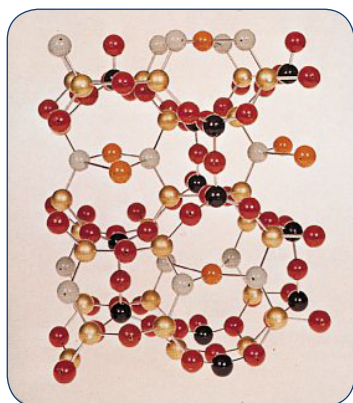


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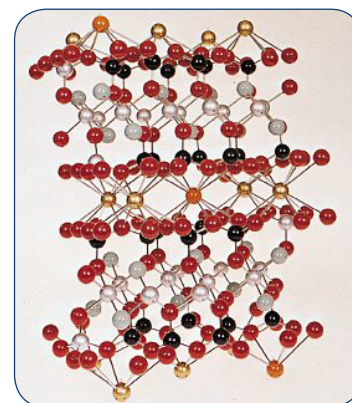
MOLECULAR MODELS



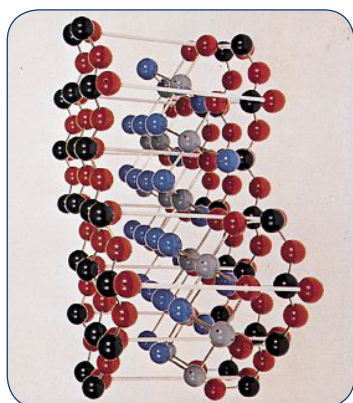
Hemimorphite



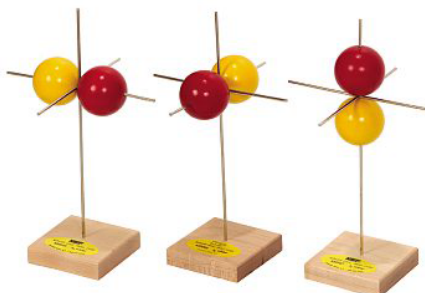
alpha-Quartz



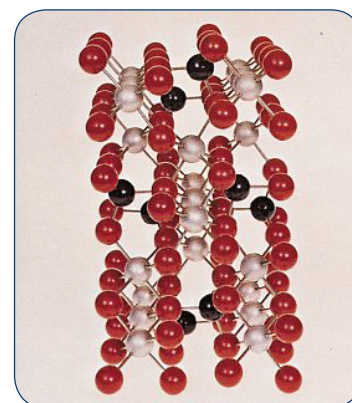
Illite



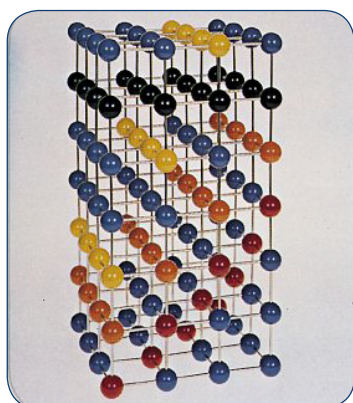
Kaolinite



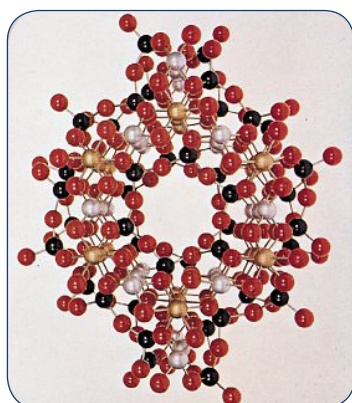
Set of 3 'p' Orbitals



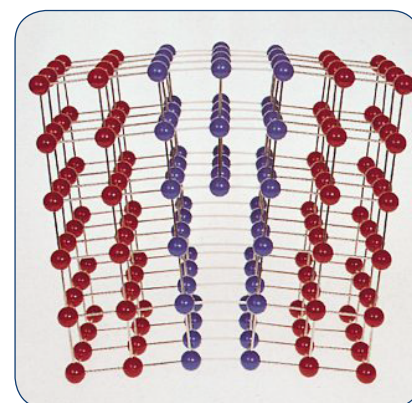
Olivine



Miller Indices



Beryl



Edge Dislocation

CALL OR VISIT THE WEBSITE FOR MORE ITEMS, EXPERIMENTS, PRICING & MANUALS

WWW.KLINGEREDUCATIONAL.COM (800) 522-6252

Crystal Model Information

Our crystal models are constructed of 2.5 cm diameter, painted, hardwood balls, representing atoms and connected by nickel plated steel spokes to demonstrate bonds. Models are built to a scale of 25 mm = 1 Å with linear dimensions accurate to $\pm 2\%$, and angular dimensions up to $\pm 4^\circ$. Color of the wooden balls conforms with that recommended by the **X-Ray Analysis Group of the Institute of Physics and Physical Society**. Models and materials are manufactured and constructed in the USA and guaranteed to be of the highest quality. For further details request Bulletin 115.

Color Code

HydrogenWhite
 Flourine.....Yellowish Green
 Chlorine.....Light Green
 Bromine.....Mid Green
 Iodine.....Dark Green

Metal.....Silver, Gold, Copper, Bronze
 Special.....Pink, Brown
 Phosphorus.....Purple
 Oxygen.....Red
 Hydroxyl.....Turquoise
 Water.....Orange or Turquoise

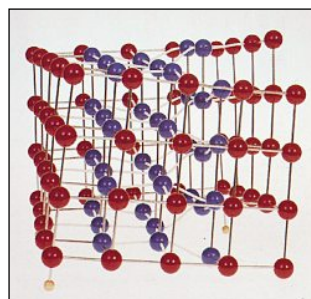
Formal Lattices

Cat.No.	Lattice	Type	# Cells	Sphs	\$
KS8102	Cubic	F-C	2x2x2	63	\$240
KS8102A	Cubic	F-C	3x3x2	123	\$360
KS8102B	Cubic	F-C	2x3x4	158	\$475
KS8102C	Cubic	F-C	3x3x3	172	\$515
KS8103	Cubic	B-C	2x2x2	35	\$125
KS8103A	Cubic	B-C	3x3x2	66	\$250
KS8103B	Cubic	B-C	3x3x3	91	\$310
KS8103C	Cubic	B-C	2x4x4	107	\$335
KS8103D	Cubic	B-C	3x4x4	148	\$585
KS8104	Hexagonal	C-P	2x2x2	35	\$140
KS8104A	Hexagonal	C-P	3x3x2	66	\$250
KS8104B	Hexagonal	C-P	3x3x3	91	\$475
KS8104C	Hexagonal	C-P	2x4x4	107	\$495
KS8104D	Hexagonal	C-P	3x4x4	148	\$800
KS8078	Triclinic		2x2x2	27	\$115
KS8105	Miller Indices		4x3x2	60	\$240
KS8106	Miller Indices		6x3x3	112	\$410
KS8110	Miller Indices		2x2x2	103	\$345
KS8108	Edge Dislocation		5x3x5	156	\$575
KS8109	Screw Dislocation		3x4x4	100	\$475
KS8456	Silicic Acid Radicles		12 ea		\$1195

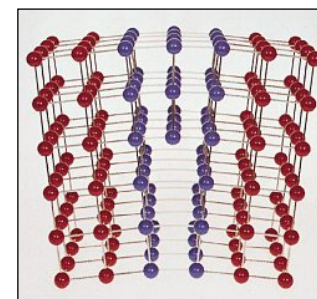
Klinger offers a series of **face-centered cubic**, **body-centered cubic** and **hexagonal close-packed structures**. The number of unit cells 2x2x2 or 3x3x2, is designated along the xyz axes.

Additional models (**KS8105** and **KS8106**) show the relationship of the **Miller Indices** to the crystallographic axis of a crystal. These models use a simple cubic lattice, 4x3x2, built with blue balls with a (111) plane shown in red, a (100) plane in black, and a (110) plane in yellow. A model, 6x3x3 cells can also show the (120) plane in orange balls.

Dislocation models (KS8108 and KS8109) demonstrate edge and screw dislocation, highlighting the displaced atoms in a different color to the undistorted matrix. Distorted bonds are made of flexible nylon rods instead of steel spokes. **KS8456 Silicic Acid Radicles** include Olivine, Hemimorphite, Benitoite, Pyroxene, Mica, Zeolite, Beryl, Amphibole, Cristobalite, Wollastonite, Apophyllite, and Felspar, all mounted clear acrylic base.



Screw Dislocation



Edge Dislocation

KS7995 Carbon Collection *Special Price

It is both the physical and chemical properties that determine the identity of a substance. The set of three carbon models, (Diamond, Graphite, Buckminster Fullerene) is the ideal teaching tool to show this principle. **KS7995 \$400***



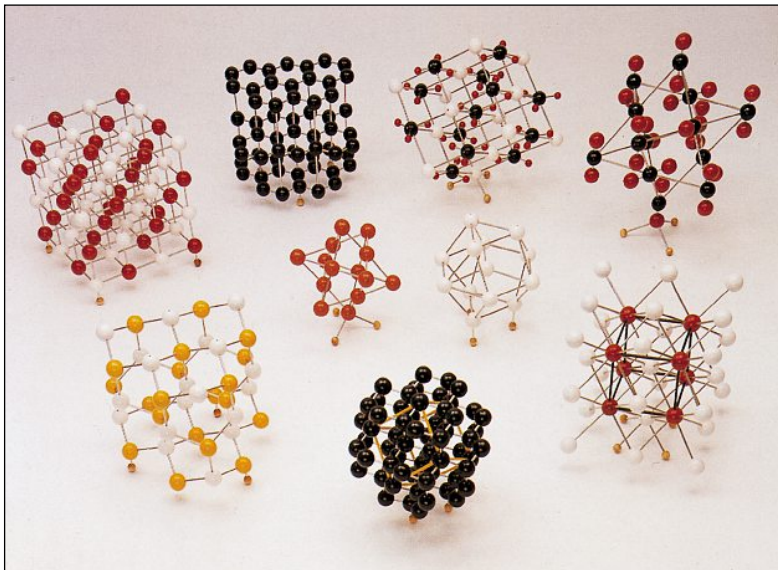
KS7999 Ball and Spoke Set *Special Price

Set contains 50 ea. 1" dia. hardwood ball atoms, precisely drilled with **26 holes each**. Most simple crystal structures, elements of symmetry and structure including Bravais lattices and all types of close-packing can be constructed. Contains 25 red and 25 black 1" dia. balls drilled with 26 holes each, 75 brass spring slit spokes 1½" long, 25 brass spokes 2½" long. Special order colors can be ordered. **KS7999 \$295***



KS7996 Set of Nine Basic Lattice Models *Special Price

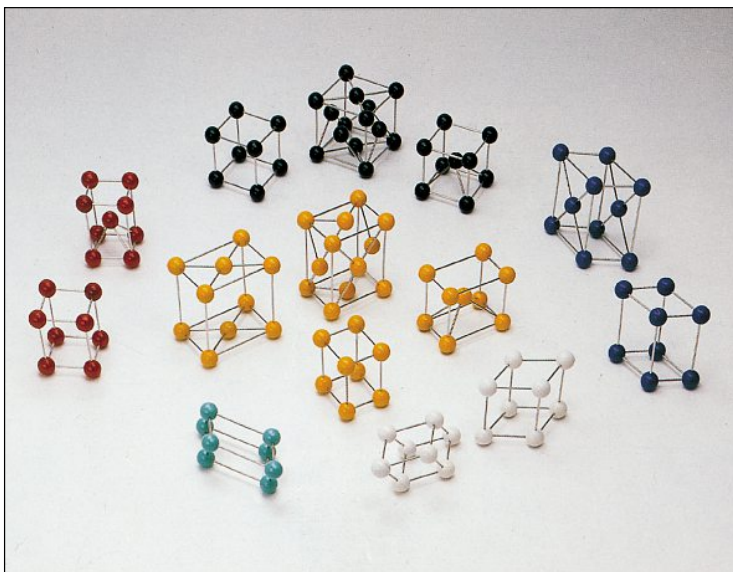
Similar patterns of atomic arrangement reappear in large numbers of different substances. Properties of substances as related to crystalline structure such as unit cell, cohesive forces, coordination numbers as well as crystal systems are easily visualized from these nine high quality color coded lattice models. Three of the six symmetry systems are represented in this set, including calcium, which is rhombohedral; graphite, magnesium, and wurtzite which are hexagonal; sodium chloride, cesium chloride, and copper, diamond, and carbon dioxide which show full cubic symmetry. Models range in height from 18cm to 38 cm and may be ordered by the set or individually. **KS7996 \$1350***



Cat.No.	Description	Price
KS7996	Set of 9 Basic Lattice Models	\$1350
KS8025	Copper	\$75
KS8041	Magnesium	\$75
KS8028	Diamond	\$260
KS 8035	Graphite	\$240
KS8016	Carbon dioxide	\$190
KS8064	Sodium chloride	\$265
KS8021	Cesium chloride	\$195
KS8074	Wurtzite	\$175
KS8011	Calcite (1/2 Unit cell)	\$260

KS7997 Set of 14 Bravais Type Models *Special Price

Designed for the teaching and study of the fundamental lattice types according to Auguste Bravais (1850), space lattices represent the 14 basic lattice types from which practically all natural crystals originate. Models have an edge length of 6 cm to 15 cm in six different colors to identify each crystal lattice with one of the six fundamental crystal structures. Each model is clearly labeled and can be ordered as a set or individually. **KS7997 \$450***



Cat. No.	Lattice	Cat. No.	Lattice
KS7997 \$450	Set of 14 Bravais		Complete Set
KS7997a \$32	Triclinic	KS7997h \$32	Tetragonal
KS7997b \$32	Monoclinic	KS7997i \$36	Tetragonal body-centered
KS7997c \$40	Monoclinic base-centered	KS7997j \$32	Rhombohedral
KS7997d \$32	Orthorhombic	KS7997k \$32	Hexagonal
KS7997e \$40	Orthorhombic base-centered	KS7997l \$32	Cubic
KS7997f \$55	Orthorhombic face-centered	KS7997m \$65	Cubic face-centered
KS7997g \$36	Orthorhombic body-centered	KS7997n \$36	Cubic face-centered
















KS7998 Supplementary Set of 18 Menzer Models

Set of eighteen lattices according to Menzer supplement the transitional Bravais lattices. May be ordered as a set of 18 or individually. Visit website for details. **KS7998 \$1100**

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Orbital Models

A set designed to demonstrate the angular distribution of the 's', 'p', 'd', and 'f' orbitals and to illustrate a number of aspects of Molecular Orbital and Crystal Field Theory. These three dimensional models help students understand ideas that may be difficult to visualize in two dimensions. Constructed of 5-8 cm red and yellow, painted hardwood orbs, lobes and discs, secured to nickel plated steel rod axes. Approximately 25 cm in height mounted on wooden bases. Available in sets or individually.

KS9004 \$40  s	KS9005 \$50  p _x	KS9006 \$50  p _y	KS9007 \$50  p _z	KS9008 \$55  d ₂
KS9009 \$60  d _{xy}	KS9010 \$60  d _{yz}	KS9011 \$60  d _{xz}	KS9012 \$60  d _{x²-y²}	KS9013 \$60  f ₃
KS9014 \$60  f ₃	KS9015 \$75  f ₃	KS9016 \$90  f _{xyz}	KS9017 \$90  f _{x(2-z²)}	KS9019 \$90  f _{x(2-y²)}

Orbital Model Sets

KS9002- Set includes of 1s, 3p, 5d, 7f orbitals, 10 sp hybrid 10 of KS9020 and 10 loose 'p' orbitals, 3 tetrahedral frames, 30 white balls. **\$1695**

KS9025- Set of three 'p' orbital models. **\$140**

KS9026- Set of five 'd' orbital models. **\$275**

KS9027- Set of seven 'f' orbital models. **\$495**

Partial Listing of Permanently Assembled Models

Cat. #	Name	Bls.	Price
KS8302	Albite	226	\$845
KS8006	Aragonite	44	\$155
KS8308	Augite	163	\$750
KS8081	Beryl	256	\$895
KS8313	Biotite	160	\$560
KS8452	Buckminster Fullerene	60	\$210
KS8011	Calcite I	66	\$260
KS8016	Carbon dioxide	42	\$190
KS8086	Cesium chloride	35	\$195
KS8024	Copper	14	\$75
KS8029	alpha-Corundum	135	\$405
KS8320	gamma-Corundum	116	\$475
KS8028	Diamond	66	\$260
KC8088	Diopside	163	\$685
KS7039	Dolomite	77	\$315
KS 7041	Enstatite	254	\$1270
KS8030	Flourite	78	\$315
KS8325	Gallium arsenide	30	\$120
KS8034	Graphite I	5	\$210
KS7053	Hemimorphite	120	\$480
KS7057	Illite	221	\$865
KS8041	Magnesium	13	\$75
KS8026	Mica (ideal structure)	221	\$885
KS7083	Montmorillonite	252	\$1050
KS8049	Olivine	109	\$435
KS8055	Pyrite	40	\$255
KS8058	Rutile	52	\$245
KS8060	Silicon	26	\$125
KS8064	Sodium chloride	64	\$265
KS8074	Wurtzite	39	\$175
KS8358	Zincblende	30	\$165