In school and college, we learnt that chemical elements combine with each other to form new substances, compounds, in very well-defined ways, obeying certain scientific rules. For example, we learned that two atoms of hydrogen and one atom of oxygen combine to form a molecule of water, and that one atom of sulfur combines with four atoms of oxygen to form a sulphate radical with electrical charge \(-2\). In chemistry these rules of combination were explained in terms of valence and bonds, and in physics the rules were explained in terms of rings of electrons and the numbers of electrons in the outermost shells of the elements.

In the world of logology, chemical elements are able to combine in other ways. For example, take ARGON and TIN. In the real world, these can’t combine, since argon is an inert element, but in our logological world these two elements combine to form the English word IGNORANT.

How many other pairs of element names can combine in this way, forming valid English words, names and phrases? We have managed to unearth 25 examples—have we missed any?

actinium + lead
aluminum + gold
argon + caesium
argon + tin
arsenic + lead
arsenic + neon
arsenic + tin
astatine + tin
boron + lead
calcium + iron
carbon + lead
cesium + tin
germanium + tin
gold + iron
goil + tin
indium + lead
iron + lead
lead + radium
lead + silver
lead + tin
lead + uranium
neon + silver
radon + tin
silver + tin

adminiculate W2
aluminum gold W2
graminaceous W3
ignorant W3
calendarise Chambers
nonincrease W2
carnitines W2
instantiate W3
bandolero W2
Acroclinium W3, Alcicornium W3
Carbondale Random House Dict
un-Semitic W2
mint geranium W3
drooling W3
dolting W2
adlumidine W3
Irondale Random House Dict
radium lead W2
Silverdale Times Index-Gazetteer
landtie New Oxford Dict of English
uranium lead W3
nonservile W2
ordinant W3
silver tin Random House Dict

However, four of these are trivial transpositions, involving no letter rearrangements.
How about three-way combinations? So far we have only been able to discover three examples:

- copper + neon + tin  
  nonperception W2
- iron + lead + tin  
  internodial W2
- lead + neon + tin  
  nonentailed W2

How about near-misses involving two different element names plus one additional letter? For example, NEON and TIN plus an extraneous C make INNOCENT. These near-misses are somewhat analogous to chemical radicals with their associated electrical charges, caused by a shortage or surfeit of electrons.

- actinium + iron  
  anticlinorium W3
- actinium + iron  
  inclinatorium W2
- americium + iron  
  microminiature W3
- antimony + argon  
  antimony orange W2, organoantimony W2 add
- argon + arsenic  
  organoarsenic W2 add
- argon + astatine  
  station-manager Chambers
- argon + bismuth  
  organobismuth W2 add
- argon + boron  
  organoboron W2 add
- argon + cerium  
  neurogrammic W3
- argon + chlorine  
  organochlorine W3
- argon + gold  
  organogold W2 add
- argon + iron  
  organoiron W2 add
- argon + lead  
  organolead W2 add
- argon + lithium  
  organolithium W2 add
- argon + magnesium  
  organomagnesium W2 add
- argon + mercury  
  organomercury W2 add
- argon + nickel  
  law-reckoning W2
- argon + phosphorus  
  organophosphorus W2 add
- argon + silicon  
  organosilicon W2 add
- argon + silver  
  organosilver W2 add, revalorizing W3 (has –ize ending)
- argon + sodium  
  monadigorous W2, organosodium W2 add
- argon + tin  
  antinegro W2, organotin W2 add
- argon + zinc  
  organozinc W2 add
- arsenic + holmium  
  aluminothermics W3
- astatine + cerium  
  quasi remittance W2
- bromine + lead  
  modernizable W2
- caesium + tin  
  insectarium W3
- calcium + neon  
  uncompliance W2, uneconomical W3
- cerium + lead  
  unreclaimed W3
- cerium + tin  
  centumviri W3
- chlorine + tin  
  antichlorine W2
- cobalt + iron  
  beta-ocrinol W2
- cobalt + tin  
  bolt action W3
- copper + tin  
  perception W3
- gallium + iron  
  anguilliform W3
- gold + lead  
  dodge ball W3
- gold + neon  
  long-nosed W3
- gold + radon  
  loading-rod OED
- hydrogen + lead  
  wrongheadedly W3
- indium + tin  
  diminution W2, diminution W3
iodine + tin
definition W3
iodine + zinc
nicotinized W3
iron + neon
non-joiner OED
iron + nickel
unicornlike W2
iron + nitrogen
reconnoitring W3
iron + tin
triunion W2
iron + zinc
zirconian W2
lead + neon
nondealer W2
lead + niobium
unmodifiable W3
lead + radon
handloader W3
lead + sodium
duodecimals W3, modularized W3 (has –ize ending)
lead + strontium
ultramodernist W3
lead + terbium
resublimated Random House Diet
lead + thorium
rheumatoidal W2
neon + radium
endocranium W3
neon + radon
ordonnance W2
neon + tin
innocent
neon + titanium
intermountain W3
niobium + tin
incumbition W2
nitrogen + tin
nonintegrity W2
oxygen + tin
antioxygen W3
platinum + tin
multipinnate W2
potassium + tin
assumptionist W3
radium + tin
miniatured W3
radon + silver
dorsiventral W3
rhodium + tin
Dinotherium W3
selenium + tin
multiengines Random House Diet, untimeliness W3
silicon + lead
delocalising Random House Dict, colonialised RHD
silicon + tin
infections W3

What about near-misses involving three different element names and an additional letter? In addition to IRON + LEAD + TIN yielding INORDINATELY and NONEDITORIAL, there is:

argon + iron + tin
nonirrigation W2
argon + lead + tin
degranulation W3
arsenic + gold + tin
reconsolidating W3
ciaesium + lead + tin
eudaemonistical W2
cesium + lead + tin
eudemonistical OED
erbium + lead + tin
denumerability OED
lead + lutecium + tin
multidenticulate W2
lead + lutetium + tin
multidenticulate W2
lead + radon + tin
intraduodenal W2
neon + silver + tin
nonservential W2

Finally, what about words using the names of four or more different elements? The best we have been able to unearth is LEAD + NEON + TIN + ZINC which with three extraneous letters yields UNCONVENTIONALIZED. Can readers supply additional examples that use dictionary words?