Puzzle title: The Underground Lab

Location: Plaza along B St., between 3rd and 2nd Avenues, in front of cinema.

Set-up: Display welcome sign. Prepare to hand out puzzle sheets.

CK Hint/Partial Data [squares = minutes, hexes = points]:

5 pts — FUSE
That message is longer than 4 letters.

7 — The grid is a periodic table of the elements. The colors are just to help you recognize it and aren't relevant to the puzzle.

14 — Some elements in this table are blank. What do the names of those elements have in common?

18 — Place the 1×6 hexomino vertically in the top right (covering element 2). What might be a good letter to use to fill in that blank?

30 — When you've placed all the hexominoes, the uncovered squares, in atomic number order, will give part of the message.

35 — Both parts of the message should be interpreted using physics rather than wordplay.

39 — When an atom undergoes alpha decay, it loses 2 protons (and 2 neutrons, but that's not important for this puzzle).

35 pts — TH, TN, THALLIUM, THORIUM
That is not the correct element. (And we just need the two-letter chemical symbol.)

40 pts — TM
(correct answer)

7 pts — PERIODIC TABLE
Yes, that is a periodic table.

18 pts — ALSOALPHADECAYONCE
Yes, that's the message at the bottom.

30 pts — FUSENBWITHZN
Yes, that's the message from the blanks.

30 pts — FUSETZNNBWIH,TZNNBWIH
Try ordering those letters based on atomic numbers.

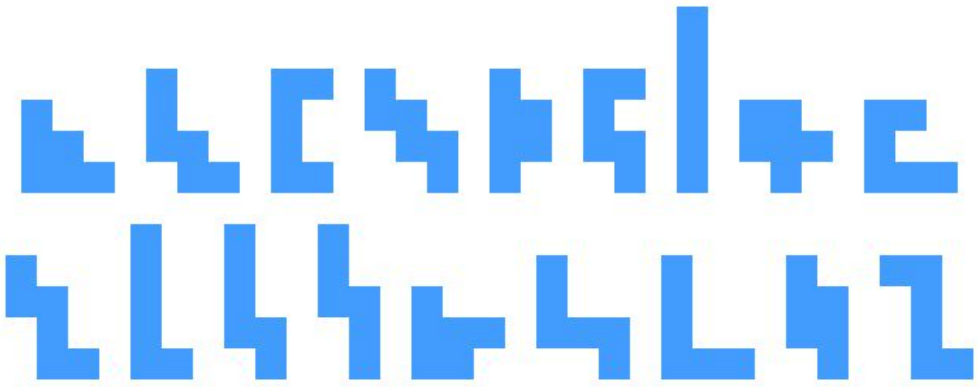
30 pts — NBZN,ZNNB,BNNZ,NZBN
Try a different kind of "fusion".

35 pts — LU,LUTETIUM
You have fused Nb with Zn correctly, but didn't you have another message?

38 pts — TRADEMARK
You've gone too far. Just the two-letter abbreviation will do fine.

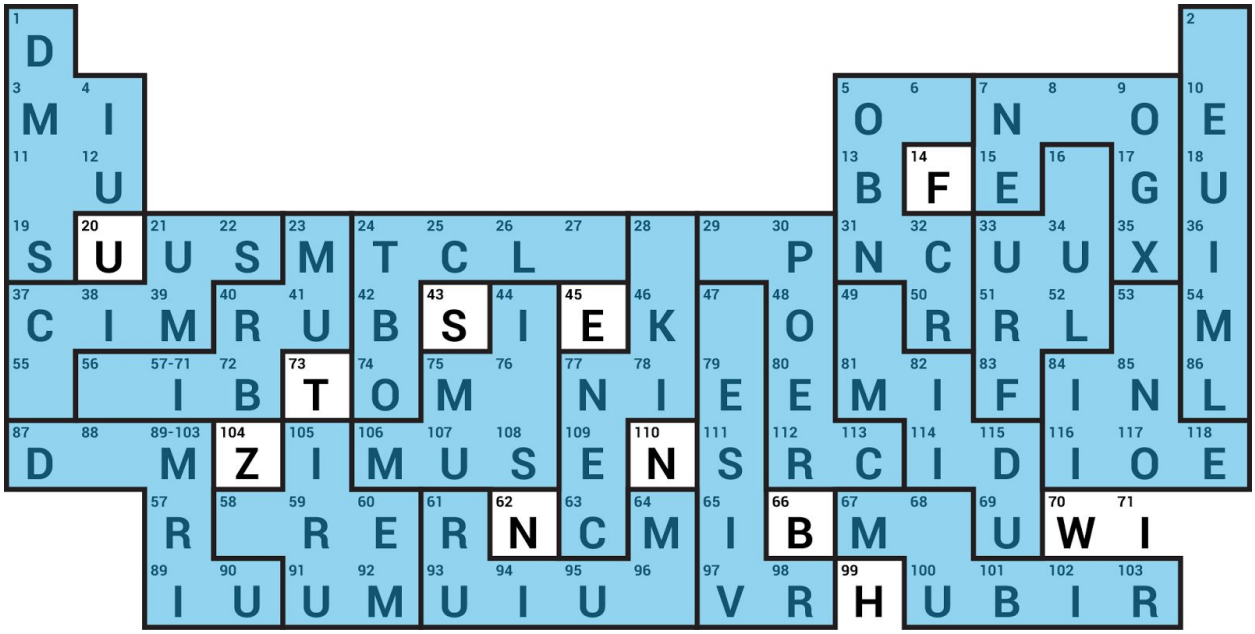
39 pts — 69/THULIUM
Almost! Enter the two-letter chemical symbol for thulium instead of [its atomic number / spelling it. (The fusion of "Nb and Zn", not "niobium and zinc".)]

Solution walk-through: Hexominoes used are the 18 with exactly 2 leaves (a "leaf" being a square with only one neighbor):



The puzzle is a large grid, obviously a periodic table (with some liberties taken in the layout, but still recognizable). The squares are numbered as in the periodic table. Most squares have a single letter -- *not* the corresponding element -- but 18 of them are blank. Below the grid are 18 blanks, a number below each, corresponding to the 18 blank squares in the grid. The blanks below the grid are spaced to form words.

The thing to do is to place the hexominoes on the grid so that each covers the five of the letters of a six-letter chemical element name plus a blank square. For instance, the 1x6 hexomino can be placed in the rightmost column to cover EUIML and the blank “2” space, implying that the 2 space should be filled with H to make HELIUM. Other good words to break in on are S(O)DIUM in the top left, with the fifth hexomino of the first row above, or OX(Y)GEN in the top right (next to HELIUM) with the rightmost hexomino in the first row above.



As each hex is placed the filled-in letters can be propagated down to the blanks below the grid, to read: ALSO ALPHA DECAY ONCE. This is the second part of the message, and can probably be determined without completely filling the grid with hexominoes. The first part of the message is the uncovered letters in the grid, for which solvers will need to finish placing all the hexominoes. Those letters, read in atomic number order, read FUSENBWITHZN, or with the intended breaks: FUSE NB WITH ZN.

This implies that solvers should imagine fusing (ie, adding the atomic numbers of) niobium (element 41) and zinc (element 30) to get lutetium (element 71), which would become thulium (element 69) after one alpha decay (which reduces the atomic number by 2). Since the message refers to elements by *symbol* (“NB” and “ZN”), they should submit the *symbol* for thulium which is the answer **TM**.