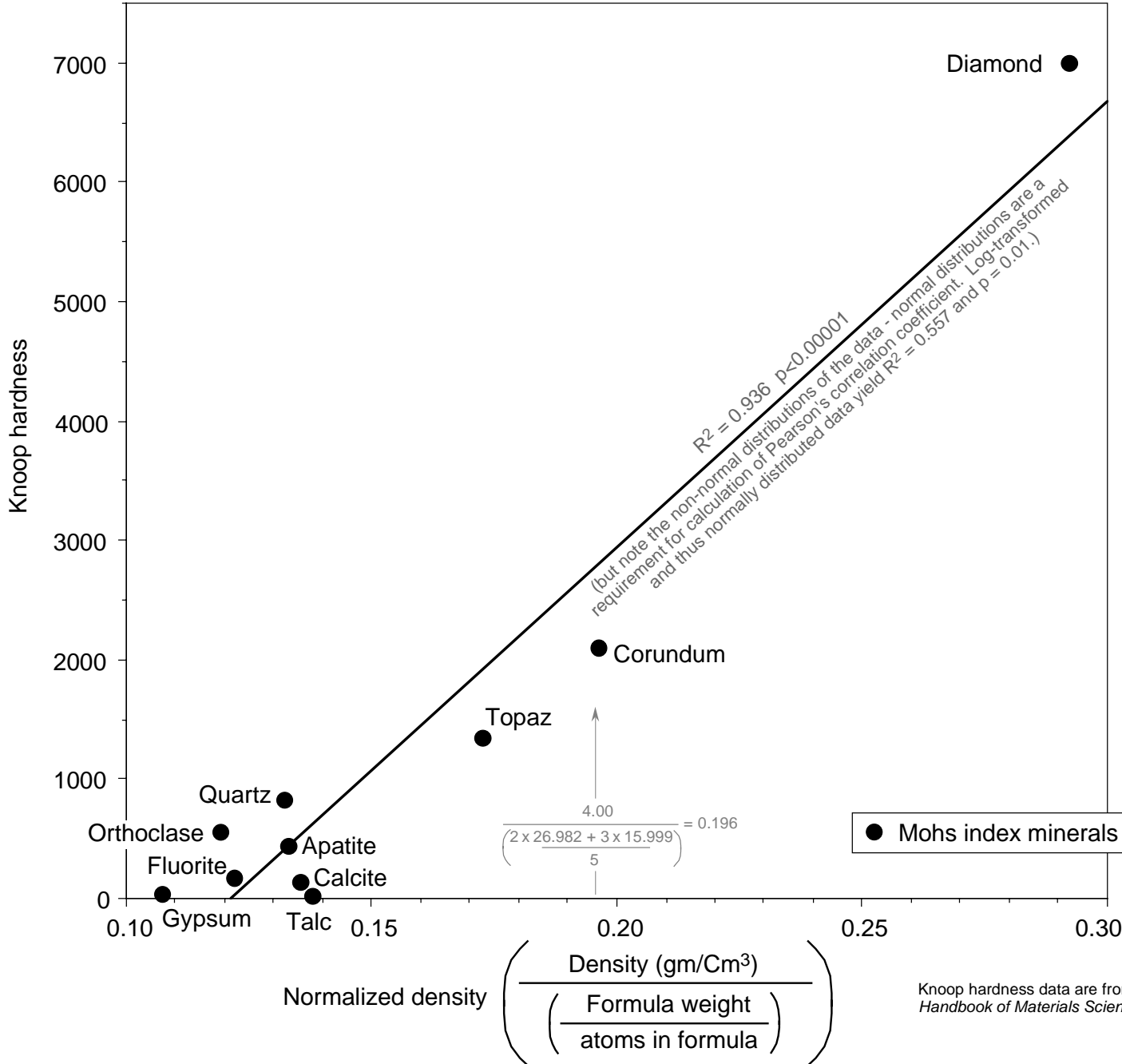


Density *and* hardness III: Knoop hardness and normalized density



Parts I and II of this series showed rough and/or non-linear correlations of density and hardness of minerals. This plot provides our best look at these parameters, with density of each mineral normalized for the average atomic weight of its constituent atoms (as discussed in Part II) and with hardness plotted using the linear Knoop scale. The correlation becomes a relatively tight one. The explanation of this correlation remains the same as that given in Part I: closer packing of atoms would give greater density *and* would allow shorter bond lengths, which allows greater hardness. In this view, greater density doesn't cause greater hardness, or vice versa. Instead, both result from an underlying crystallographic or structural characteristic, the packing of the mineral's atoms.

Knoop hardness data are from pp. 344-345 of Lynch, 1974, *CRC Handbook of Materials Science*: Boca Raton, CRC Press, 752 p.