The studies of lattice parameter and electrochemical behavior for
Li$_3$V$_2$(PO$_4$)$_3$/C cathode materials

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Single-phase, nano-sized Li$_3$V$_2$(PO$_4$)$_3$/C materials with the monoclinic structure were
prepared by a modified sol-gel method, in which the precursor materials were sintered at 750,
800, 850, and 900 °C, respectively. The X-ray diffraction (XRD) patterns of all the materials
were consistent with the monoclinic structure without any impurities. The LVP/C composite
sintered at 800 °C was selected as the most promising material on the basis of the lattice
parameters ($a = 8.605$ Å, $b = 8.596$ Å, $c = 14.732$ Å, $\beta = 125.20$ °, $V = 890.59$ Å$^3$), crystallite
size (99 nm), and morphology (5–6 nm carbon layer). The LVP/C composite sintered at 800 °C
showed a high specific capacity with excellent kinetic properties (capacity of 130 and 170
mAh·g$^{-1}$ at voltages of 3.0–4.3 and 4.8 V at 0.1 C, 25 °C), which showed about 98%, 86% of
its theoretical capacity, respectively.

References: