The clusters of methane with para-hydrogen molecules (CH$_4$-(p-H)$_n$, n=1~30) were formed in He droplets and studied via laser depletion spectroscopy. The rotationally resolved $\nu_2$ transition of the cluster was observed with changing the number of hydrogen molecules. Large spectral change was seen around n=12 and 30, which suggests the completion of the first and second H$_2$ solvation shells of the CH$_4$ molecule. The aggregate state of the H$_2$ cluster is discussed.