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## SiP<sub>2</sub> prepared by mechanosynthesis as novel anode material for Li-ion batteries

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## Supplementary informations

Figure SI1: XRD after different duration of milling.

 $SiP_2$  microparticles were prepared by ball milling of Si and red P powders. Figure SI1 shows the XRD after various ball milling duration. An active-milling time of 16h of the stoichiometric mixture Si-2P allowed obtaining a complete reaction between Si and P. An intimate mixture Si/P in 1/2 composition was also prepared by a short grinding (15 min) for further electrochemical comparison.



**Figure SI2**: Galvanostatic profile (associated derivative in inset) and capacity and coulombic efficiency as function of cycles number of Si:2P mixture electrode, a) cycled versus Li at C/2 rate between 1.50V and 0,0V in 1M LiPF<sub>6</sub> in EC:PC:3DMC with 1% VC 5% FEC and b) cycled versus Na in 1 M NaPF<sub>6</sub> dissolved in diglyme.



Figure SI3: Capacity retention calculated for SiP<sub>2</sub> and SiP<sub>2</sub>/C electrodes.