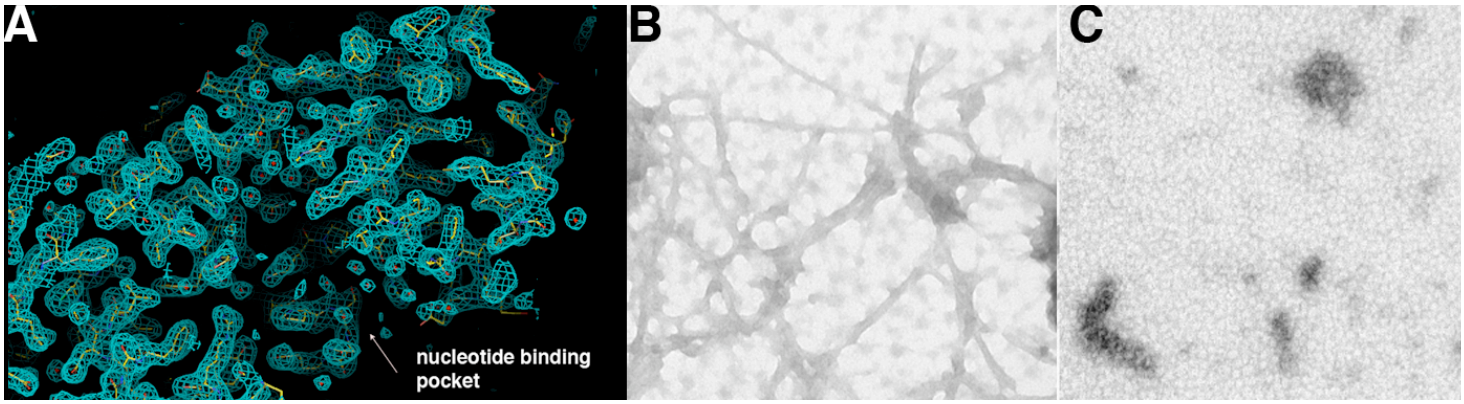
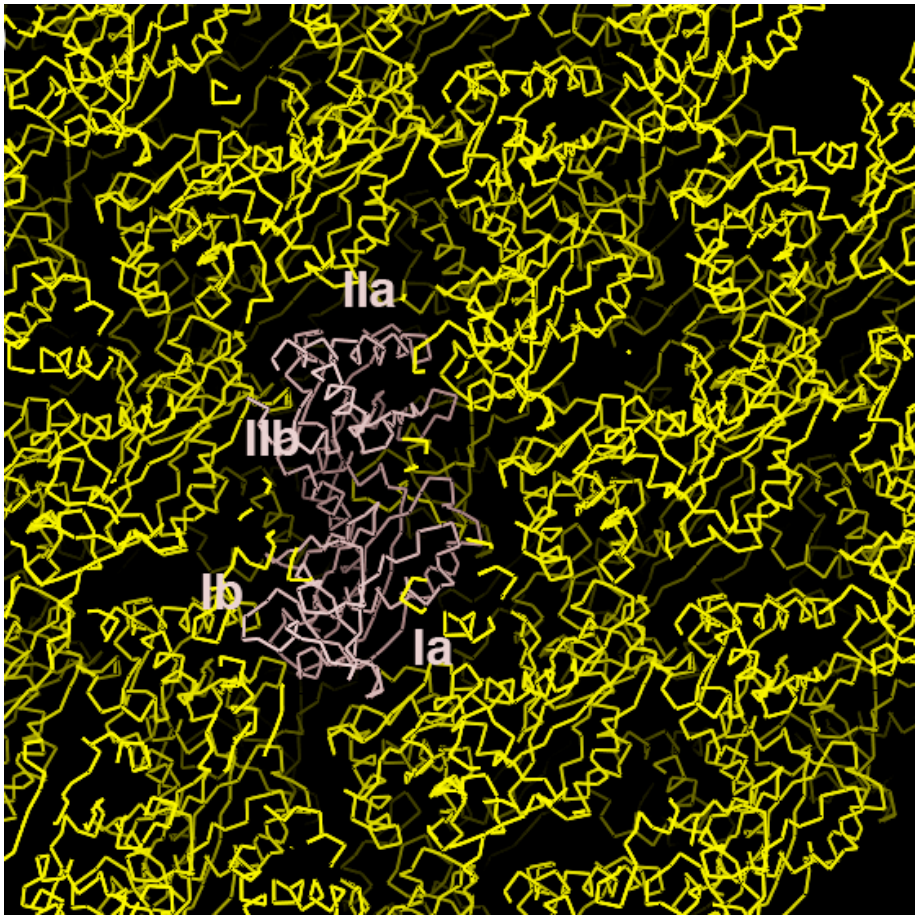
Supplementary Figures

Supplementary Figure S1



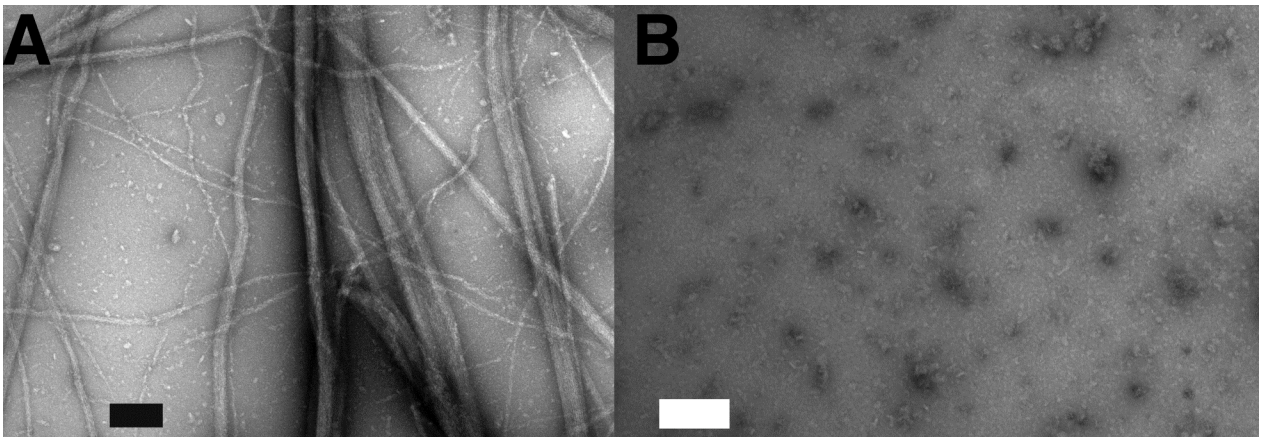
Supplementary Figure S1: A Composite 2Fo-Fc omit electron density map contoured at 1 σ around the binding pocket of pSK41 ParM. There are no molecules in the binding pocket that can mimic ATP. **B** Negative stain EM image of pSK41 ParM in the presence of 2 mM ATP, 5 mM $MgCl_2$. **C** Negative stain EM image of pSK41 ParM in 1.5 M citrate pH 5.6. Note the presence of citrate does not induce filament formation.

Supplementary Figure S2



Supplementary Figure S2: Crystal packing image of the pSK41 ParM structure. Shown in pink is the crystallographic asymmetric unit (a monomer). The subdomains Ia, Ib, IIa and IIb are labeled. This figure shows that there are several contacts to each subdomain in the crystal.

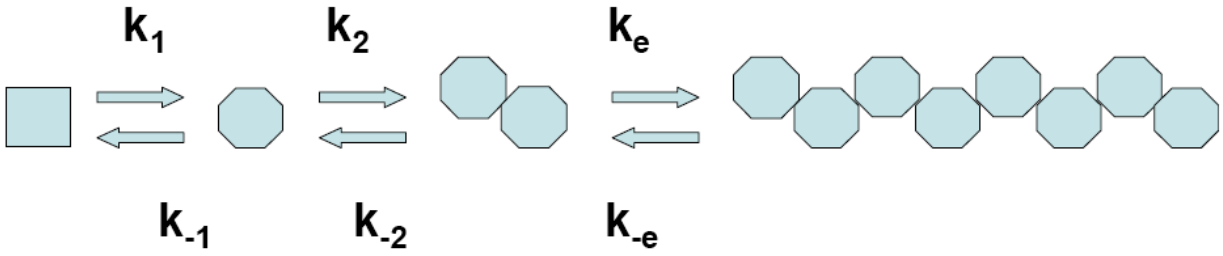
Supplementary Figure S3



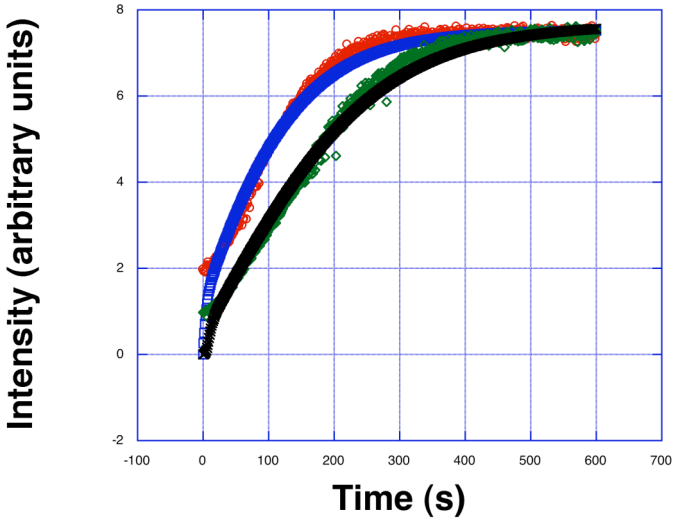
Supplementary Figure S3: pSK41 ParM filament structure. **A** pSK41 ParM-ATP filaments produced under physiological salt concentrations (300 mM KCl, 2 mM $MgCl_2$, 0.2 mM DTT, 25 mM Hepes, pH 7.4) and 2 mM ATP. **B** pSK41 ParM in the same buffer but replacing 2 mM $MgCl_2$ with 2 mM EDTA showing that divalent cations are required for pSK41 ParM polymerization.

Supplementary Figure S4

A

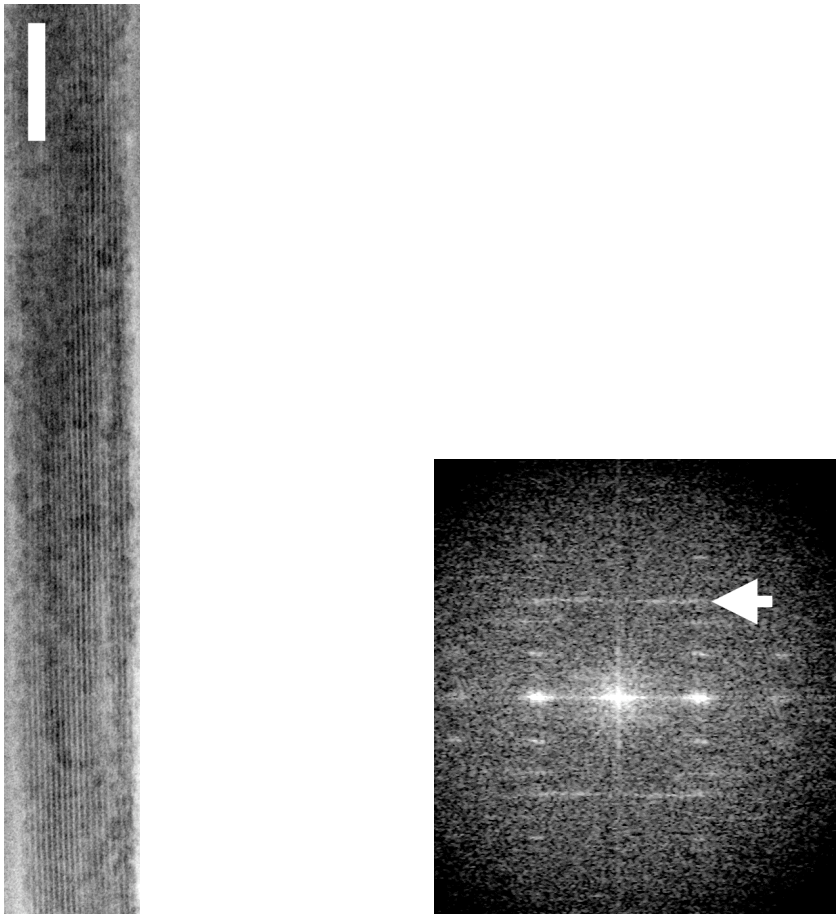


B



Supplementary Figure S4: Minimal kinetic model of pSK41 ParM polymerization.
A Schematic view of the reaction scheme.
B Polymerization time courses as shown in Figure 8A in the main text together with the fitted data using the minimal kinetic model. Red = pSK41 ParM-ATP, Blue = fit. Green = pSK41 ParM-GTP, Black = fit.

Supplementary Figure S5



A **B**

Supplementary Figure S5: pSK41 filaments labeled with Alexa 488 used for TIRF microscopy.
A Typical electron micrograph of labeled pSK41 ParM, scale bar 200 nm.
B Typical Fourier transform of the filaments, the arrow marks the 57 Å layer line.