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Supplementary Information

Atomic force microscopy of DNA at high humidity: irreversible conformational switching of supercoiled molecules

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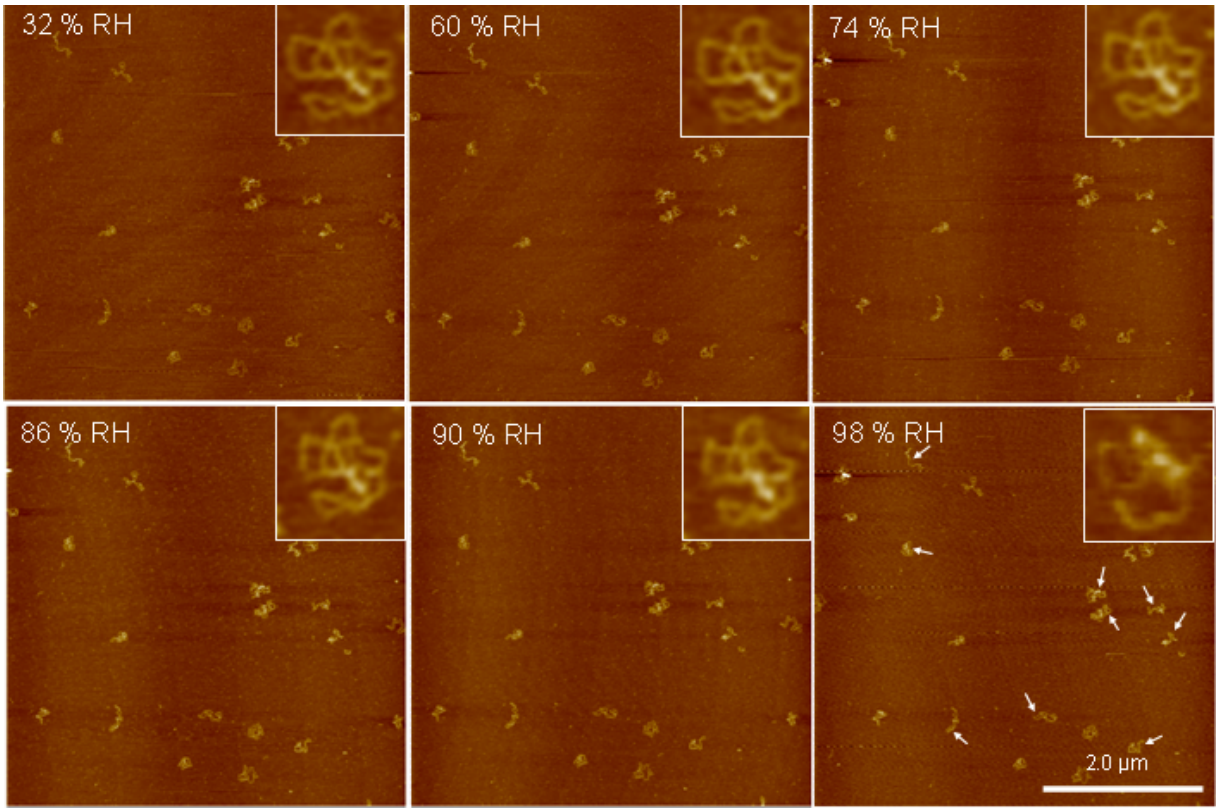

Figure S1. Series of AFM images showing the same region of a sample of closed circular (CC) plasmid prepared with Mg(II) in the buffer and pre-treating the mica with Ni(II) ions. The relative humidity (RH) is gradually increasing and only at very high RH (~ 98 %) can local conformation changes be observed. A number of these changes are indicated with white arrows.

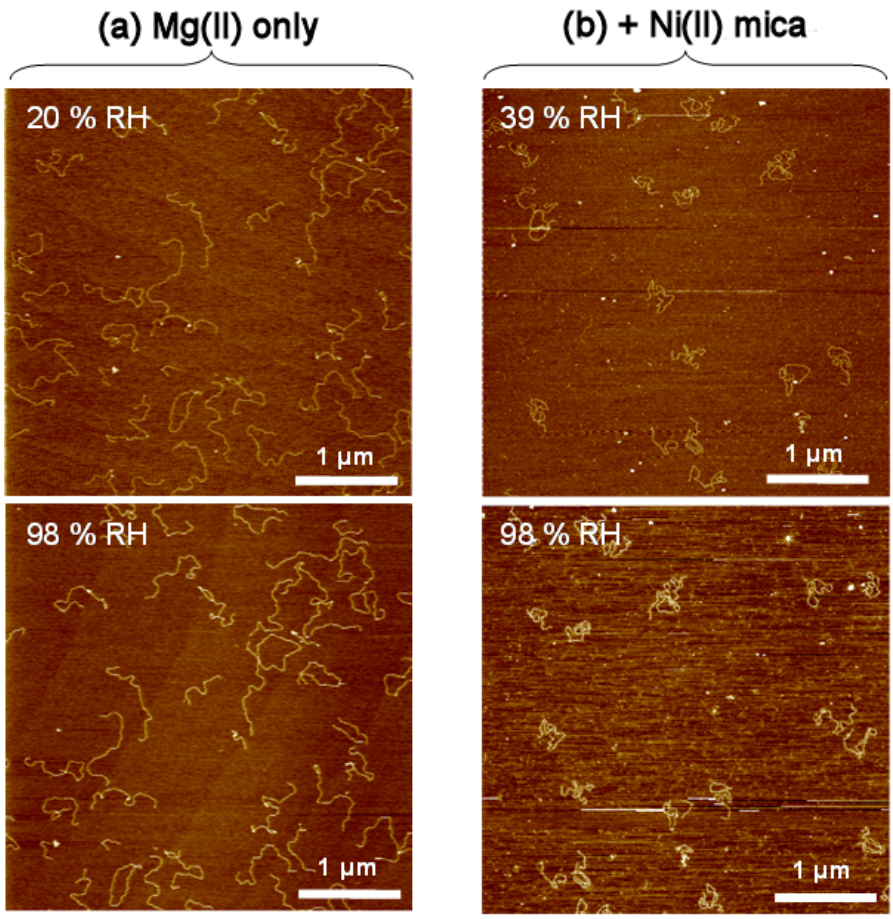

Figure S2. Images of linearized plasmid (lin.) at both low and high humidity of the same region prepared with Mg(II) (a) on mica and (b) Ni(II)-mica. No changes in conformation at high relative humidity are observed in either case.

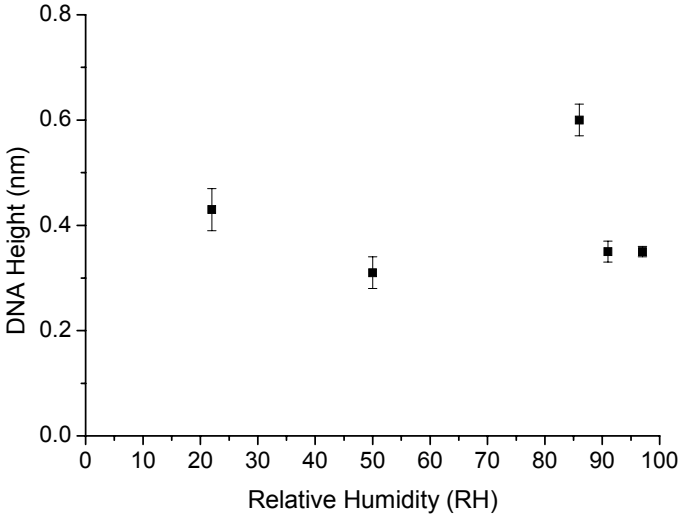

Figure S3. Average DNA height versus relative humidity (RH) for individual double-stranded linear DNA (lin.) helices lying against the mica surface (n=50). There is no apparent correlation between measured height and the RH when imaging by repulsive force regime AM AFM.

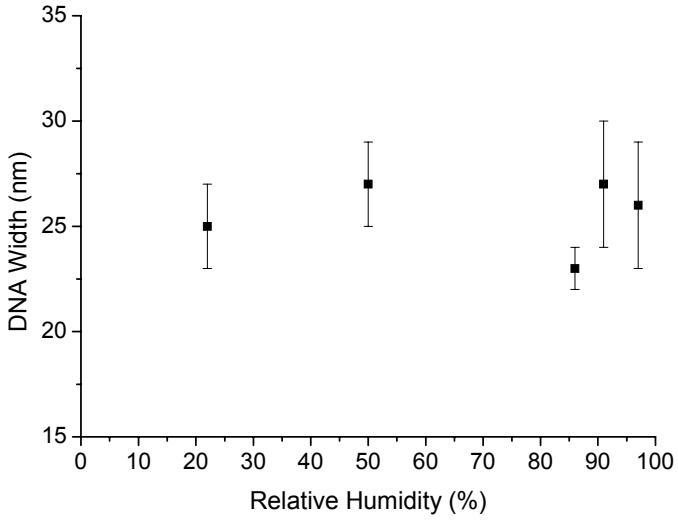

Figure S4. Average DNA width versus relative humidity (RH) for individual double-stranded linear DNA (lin) helices lying against the mica surface (n=50). There is no apparent correlation between measured width (full width at half-height) and the RH when imaging by repulsive force regime AM AFM.

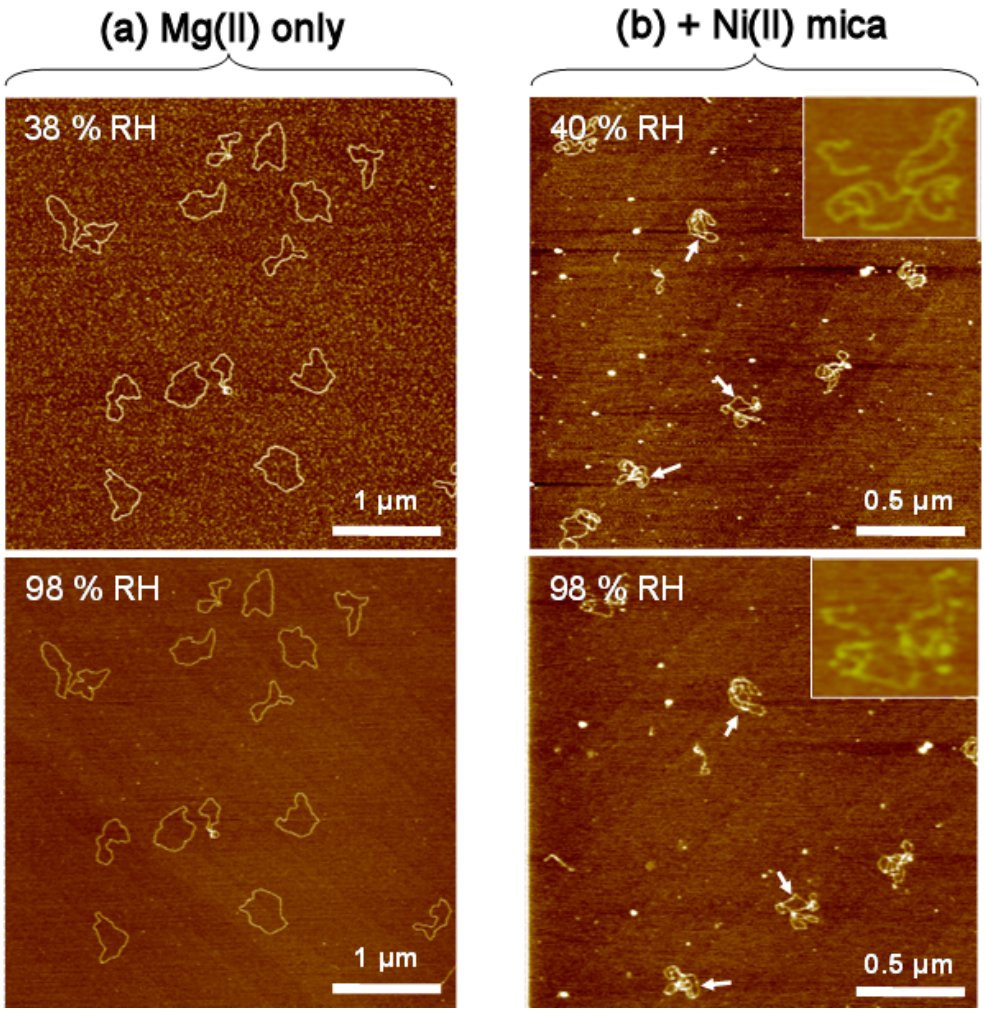

Figure S5. Images of relaxed (OC) plasmids at both low and high humidity prepared with Mg(II) (a) on mica and (b) Ni-mica. In (a) no changes of conformation can be observed, while in (b) small, localized conformational changes can be observed at high humidity.

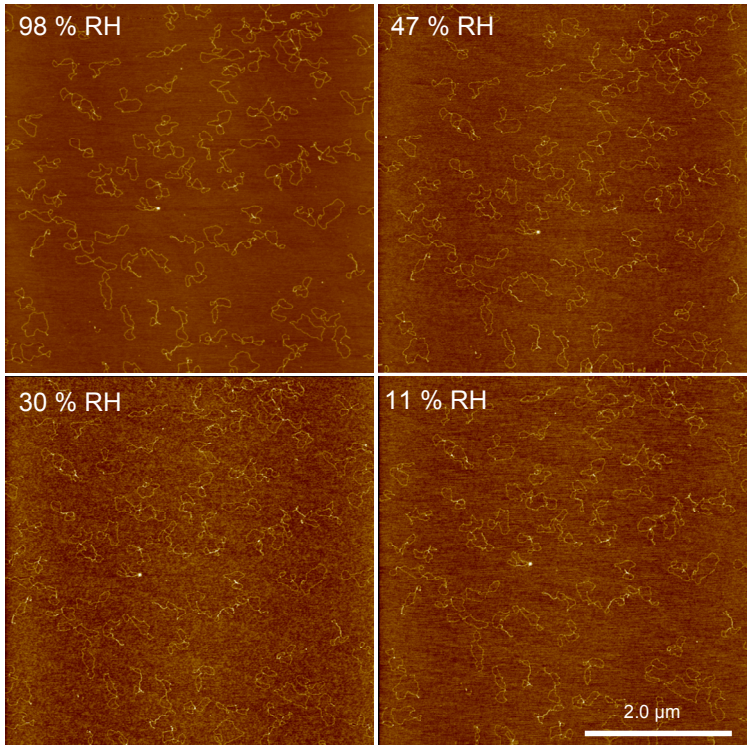

Figure S6. Series of AFM images showing the same region of a sample of closed circular (CC) plasmid pBR322 prepared with Mg(II) on mica. The relative humidity (RH) is gradually *decreasing* as shown in the top left of each image. No changes in DNA conformation are observed once the changes at high humidity (~ 98 % RH) have occurred. While the background image noise increases at lower RH, no changes in the apparent dimensions of the DNA occur (see Figs. S3 and S4).