CLAIMS:

1. A system for etching a semiconductor substrate using catalyst influenced chemical etching, the system comprising:

a group of independently controlled discrete actuators configured to control a depth of an etch of a material on a substrate, wherein said group of independently controlled discrete actuators is arranged such that a density of said group of independently controlled discrete actuators is increased in regions of higher local pattern density of features on said substrate, wherein at least two of said group of independently controlled discrete actuators has distinct actuation values, wherein said etch depth has a variation of less than 10% of a feature height across said substrate.

2. The system as recited in claim 1, wherein an etch rate of said etch is reduced prior to reaction quenching to reduce etch height variation.

3. The system as recited in claim 2, wherein a spatial variation in said etch rate is monitored in-situ.

4. The system as recited in claim 3, wherein a proxy of said spatial variation in said etch rate is monitored in-situ.

5. The system as recited in claim 4, wherein a spectral signature corresponding to said feature height is used as said proxy.

6. The system as recited in claim 3, wherein said in-situ monitoring is achieved using spectrophotometry of a process wafer.

7. The system as recited in claim 1 further comprising: a feedback-based system used to control process variation.

8. The system as recited in claim 1, wherein a feedforward approach is used to control process variation.

9. The system as recited in claim 1, wherein a hybrid approach is used to control process variation.

10. The system as recited in claim 1, wherein said substrate has device patterns of a first type next to device patterns of a second type.

11. The system as recited in claim 10, wherein a pattern of said second type is free of sub-1-micrometer sized patterns.

12. The system as recited in claim 10, wherein a pattern of said second type is free of sub-0.5-micrometer sized patterns.

13. The system as recited in claim 1, wherein said group of independently controlled discrete actuators control bubble evolution from said etch to an extent that permits incident radiation for in-situ metrology to have a transmission of higher than 10% across an entirety of said substrate.

14. The system as recited in claim 1, wherein a catalyst is deposited on a surface of said substrate, wherein said catalyst is comprised of one or more of the following: Ru, Au, Pt, Pd, Ag, Cu, Ni, W, TiN, Graphene, Carbon, and Cr.

15. The system as recited in claim 1, wherein an etchant for said etching is in liquid or vapor form.

16. The system as recited in claim 1, wherein a catalyst layer is deposited on a surface of said substrate, wherein catalytic activity of said catalyst layer is modified by exposing a catalyst of said catalyst layer to plasma.

17. The system as recited in claim 16, wherein said plasma does not contain oxygen.

18. The system as recited in claim 1, wherein a catalyst is deposited on a surface of said substrate, wherein a surface area of said catalyst exposed to an etchant is optimized to reduce porosity during said catalyst influenced chemical etching.