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(19) **United States**(12) **Patent Application Publication****Ventzek et al.**(10) **Pub. No.: US 2023/0230814 A1**(43) **Pub. Date:****Jul. 20, 2023**(54) **METHOD AND APPARATUS FOR PLASMA PROCESSING**(71) Applicant: **Tokyo Electron Limited**, Tokyo (JP)(72) Inventors: **Peter Ventzek**, Austin, TX (US); **Alok Ranjan**, Austin, TX (US)(21) Appl. No.: **18/189,519**(22) Filed: **Mar. 24, 2023****Related U.S. Application Data**

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(57)

ABSTRACT

A method of processing includes directing an electron beam comprising ballistic electrons from an electron source towards a peripheral region of a substrate to be processed. The peripheral region surrounds a central region of the substrate. The electron beam may be directed such that the ballistic electrons impinge on the peripheral region and not on the central region of the substrate. The ballistic electrons may stimulate chemical reactions on the substrate. The method may include placing the substrate on a substrate holder disposed within a vacuum chamber. The method may also include generating the electron beam from a plasma in the vacuum chamber. The method may further include processing the substrate with ions from the plasma.

