

(12) 按照专利合作条约所公布的国际申请

(19) 世界知识产权组织
国际局



(10) 国际公布号
WO 2025/044560 A1

(43) 国际公布日
2025 年 3 月 6 日 (06.03.2025)

- (51) 国际专利分类号:
H01L 21/306 (2006.01) **H01L 21/67** (2006.01)
H01L 21/3063 (2006.01)
- (21) 国际申请号: PCT/CN2024/105560
- (22) 国际申请日: 2024 年 7 月 15 日 (15.07.2024)
- (25) 申请语言: 中文
- (26) 公布语言: 中文
- (30) 优先权:
202311118460.X 2023年8月31日 (31.08.2023) CN
- (71) 申请人: 盛美半导体设备(上海)股份有限公司
(**ACM RESEARCH (SHANGHAI), INC.**) [CN/CN]; 中国上海市浦东新区中国(上海)自由贸易试验区蔡伦路1690号第4幢, Shanghai 201203 (CN)。
- (72) 发明人: 任正博(**REN, Zhengbo**); 中国上海市浦东新区中国(上海)自由贸易试验区蔡伦路1690号第4幢, Shanghai 201203 (CN)。 金一诺(**JIN, Yinu**); 中国上海市浦东新区中国(上海)自由贸易试验区蔡伦路1690号第4幢, Shanghai 201203 (CN)。
- (74) 代理人: 上海专利商标事务所有限公司(**SHANGHAI PATENT & TRADEMARK LAW OFFICE, LLC**); 中国上海市徐汇区桂平路435号, Shanghai 200233 (CN)。
- (81) 指定国(除另有指明, 要求每一种可提供的国家保护): AE, AG, AL, AM, AO, AT, AU, AZ, BA, BB, BG, BH, BN, BR, BW, BY, BZ, CA, CH, CL, CN, CO, CR, CU, CV, CZ, DE, DJ, DK, DM, DO, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, GT, HN, HR, HU, ID, IL, IN, IQ, IR, IS, IT, JM, JO, JP, KE, KG, KH, KN, KP, KR, KW, KZ,

(54) **Title:** ELECTROCHEMICAL ETCHING METHOD AND ELECTROCHEMICAL ETCHING DEVICE

(54) 发明名称: 电化学刻蚀方法及电化学刻蚀装置

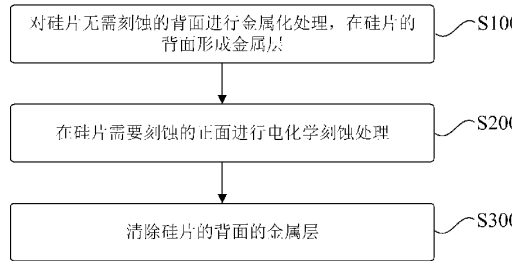


图 2

S100 Perform metallization treatment on the back surface, on which etching is not needed, of a wafer, and form a metal layer on the back surface of the wafer

S200 Perform electrochemical etching treatment on the front surface, on which etching is needed, of the wafer

S300 Clear the metal layer on the back surface of the wafer

(57) **Abstract:** The present invention relates to the technical field of semiconductor processing, and provides an electrochemical etching method and an electrochemical etching device. The electrochemical etching method comprises: performing metallization treatment on the back surface, on which etching is not needed, of an object to be etched, and forming a metal layer on the back surface of said object; and performing electrochemical etching treatment on the front surface, on which etching is needed, of said object. Before the electrochemical etching treatment, metallization treatment is firstly performed on the back surface of said object, so that the resistance

[见续页]

LA, LC, LK, LR, LS, LU, LY, MA, MD, MG, MK, MN, MU, MW, MX, MY, MZ, NA, NG, NI, NO, NZ, OM, PA, PE, PG, PH, PL, PT, QA, RO, RS, RU, RW, SA, SC, SD, SE, SG, SK, SL, ST, SV, SY, TH, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, WS, ZA, ZM, ZW。

- (84) 指定国(除另有指明, 要求每一种可提供的地区保护): ARIPO (BW, CV, GH, GM, KE, LR, LS, MW, MZ, NA, RW, SC, SD, SL, ST, SZ, TZ, UG, ZM, ZW), 欧亚 (AM, AZ, BY, KG, KZ, RU, TJ, TM), 欧洲 (AL, AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, IS, IT, LT, LU, LV, MC, ME, MK, MT, NL, NO, PL, PT, RO, RS, SE, SI, SK, SM, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, KM, ML, MR, NE, SN, TD, TG)。

本国际公布:

— 包括国际检索报告(条约第21条(3))。

of said object can be greatly reduced, effectively avoiding the edge effect of said object; and the potentials at positions of the surface of said object can be accurately controlled by energizing the metal layer on the back surface of said object, so that the potentials at the positions of said object are kept consistent, and uneven current density distribution in the etching process is avoided, thereby accurately controlling the etching rate of said object, and greatly reducing the difficulty of electrochemical etching of said object having poor conductivity.

(57) 摘要: 本发明提供了一种电化学刻蚀方法及电化学刻蚀装置, 涉及半导体加工技术领域。电化学刻蚀方法包括: 对刻蚀对象无需刻蚀的背面进行金属化处理, 在所述刻蚀对象的背面形成金属层; 对所述刻蚀对象需要刻蚀的正面进行电化学刻蚀处理。在电化学刻蚀处理之前, 首先对刻蚀对象的背面进行金属化处理, 能够极大地降低刻蚀对象的电阻, 从而可以有效地规避刻蚀对象边缘效应, 通过向刻蚀对象的背面的金属层通电, 能够准确地控制刻蚀对象表面各处的电势, 使刻蚀对象各处的电势保持一致, 避免了刻蚀过程中, 电流密度分布不均匀, 进而可以准确地控制刻蚀对象的刻蚀速率, 极大地降低了导电性较差的刻蚀对象的电化学刻蚀的难度。