

Index

- 1D-silica 130–131, 147
- α -cristobalite 5, 8
- α -quartz 3–5, 17, 19, 22–24, 35, 99, 128, 273, 295, 302
- adhesion 126, 137–138, 156, 300
- aluminosilicate films 192, 198–203, 205, 211, 212, 287–289
- aluminosilicates 10, 13, 191–192, 195, 200, 202, 211, 287
- antiphase domain boundary (ADB) 150, 259
- atomic force microscopy (AFM) 20–22, 33, 76, 98, 124, 168, 195, 274
- atomic layer deposition (ALD) 63, 94, 96
- Auger electron spectroscopy (AES) 32, 36–37, 39–41, 43, 73, 110, 113, 129, 149, 200
- Auger parameter (AP) 40, 42, 265
- β -cristobalite 3, 5–6, 8, 24–25, 80, 112–113
- β -quartz 3–4, 128
- β -tridymite 6, 8
- band gap 16, 19, 53, 82, 88–89, 91, 112, 168, 303
- chemical vapor deposition (CVD) 61, 63, 94, 148, 179, 199, 218
- clay minerals 10–12, 21, 199, 204, 211–212
- coesite 2–5, 17
- continuous random network (CRN) 7, 9, 185–186
- cristobalite 2–3, 5, 77, 110, 113, 295
- Deal-Grove model 72, 83
- defect structures 168, 171–174, 178, 279, 293–294
- density functional theory (DFT) 4, 24, 76, 85, 113, 123–126, 131, 135, 137, 147, 169, 174–175, 178, 202, 220, 222, 227, 243, 251, 253–254, 258, 273, 277–278, 295
- deposition methods 57, 61, 63
- diffusion 70–71, 129, 240, 244, 248, 250, 267
- electron energy loss spectroscopy (EELS) 19, 55–56, 73
- electron microscopy 55, 76–77, 188
- Fe-Al-silicate 214
- Fe-silicate 204–206, 211–213, 215, 221, 223–225, 289
- Fe-silicate films 204–212, 214, 220, 225, 289
- feldspars 13, 191

- germanene 293–294
- graphene 159, 174, 179, 182, 185, 188, 293–304
- high-resolution electron energy loss spectroscopy (HREELS) 33, 48–50, 73, 113, 149, 219, 275
- high-resolution transmission electron microscopy (HRTEM) 76–77
- hydroxylation 278, 281, 283–286
- inelastic mean free path (IMFP) 33–34, 38, 287
- infrared reflection-absorption spectroscopy (IRAS) 33, 44–45, 47, 50–51, 57, 86, 95, 109, 113–114, 121, 135, 137, 141, 146, 154–155, 198, 201–202, 204–206, 209, 212–213, 216, 226–227, 236–237, 240–244, 255, 275, 280, 283–288, 297–298, 300
- low-energy electron diffraction (LEED) 19, 22, 33, 35–36, 59, 83–85, 89–90, 108, 110–113, 115, 123, 126, 128, 134, 139, 141–144, 147, 150, 152–155, 158, 168, 170, 176–178, 183–184, 201, 203, 206, 212, 220–221, 224–225, 235–236, 276–277, 298–299
- low-energy ion surface scattering (LEISS) 33
- metal-oxide-semiconductor (MOS) 80
- metal silicides 128–129
- metastable impact electron spectroscopy (MIES) 112, 168
- mica 10–12, 20–21, 195, 273, 275
- minerals 10, 13, 191, 204, 222
- Moiré structure 176, 207
- molecular beam epitaxy (MBE) 62
- monolayer silicate 119–120, 129–130, 133, 135, 155, 168–169, 173, 177, 200–201, 219, 262, 283
- phonons 33–34, 45–46, 121
- phyllosilicates 10, 12–13
- physical vapor deposition (PVD) 61–63, 200
- pulsed-laser deposition (PLD) 62–63
- quartz 2–3, 7–8, 10, 19, 23, 42, 48, 112–113, 118, 128, 148, 273–274, 302
- reflection high energy electron diffraction (RHEED) 19, 77, 174
- scanning tunneling microscopy (STM) 20, 33, 51–53, 74, 76, 88, 115, 124, 134, 140, 144, 146–148, 154–155, 158, 168, 174, 181, 186, 188, 200, 202, 206, 210, 214, 249, 254, 259–260, 276, 282–283, 298–299, 301
- silane 94–96, 148, 169
- silanols 95–96, 98, 169, 199, 272, 279–283, 286, 288
- silica glasses 5–79, 18, 183–187, 188
- silica hydroxylation 169, 281
- silicalites 14, 195, 204, 215

- silicene 293–294, 303
- silicides 128, 132, 146
- silicon (Si) 3, 69, 81, 86, 90, 96, 148, 150
- silicon carbide 81, 298–299, 301
- silicon nitride 90–91
- surface phonons 48
- surface x-ray diffraction (SXR) 33

- temperature-programmed
 - desorption (TPD) 33, 235, 240, 242, 244, 246–250, 254, 262, 275
- Ti-silicate 221, 223
- Ti-silicate films 215, 217, 219–221, 223
- titanosilicates 222
- tridymite 2–3, 80, 110, 113

- ultraviolet photoelectron spectroscopy (UPS) 32, 38, 112, 117, 168

- vibrational spectroscopy 33, 151, 154–155, 205, 240

- water adsorption 202, 204, 273–277, 279–280, 289
- work function (WF) 52–53, 139–140, 262, 265, 268

- x-ray absorption spectroscopy (XAS) 91
- x-ray diffraction (XRD) 1, 77, 185, 199–200
- x-ray photoelectron spectroscopy 32, 36–37, 39–43, 72, 74, 76, 78–80, 85–86, 92, 95, 109–112, 114, 116–117, 128, 133, 137, 146, 148, 175, 198–201, 205, 213, 237, 255, 265–266, 297–299

- zeolite films 192, 194, 196, 199, 205
- zeolite nanosheets 196, 198
- zeolite surfaces 200, 289
- zeolites 2, 13–15, 20, 191–195, 199–200, 202, 204, 215, 254, 266, 288–289
- zigzag silica 141

