

## Laser materials processing

1. The unique properties of laser light and their effect on materials processing
2. System level parameters of laser processing (power, power density, pulse energy, wavelength, focusing, laser modes, beam quality, polarisation)
3. The thermal model of laser materials processing
4. Laser induced structural change (diffusion, grain coarsening, sintering, structural hardening)
5. Laser forming
6. Laser scribing
7. Laser surface engineering (surface melting, surface structuring, thin film deposition (PLD, LCVD), laser shock peening, transformational hardening, cladding)
8. Laser soldering and brazing
9. Conduction joining
10. Laser drilling and cutting
11. Laser marking
12. Keyhole welding
13. Photolithography
14. Micromachining
15. Laser based techniques of 3D printing
16. Ultrafast laser processing

### **Further reading:**

- Elijah Kannatey-Asibu Jr.: *Principles of laser materials processing*, Wiley, 2009
- W.M. Steen and J. Mazumder: *Laser material processing*, 4th ed., Springer, 2010
- John. C. Ion: *Laser processing of engineering materials*, Elsevier, 2007