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Nota di contenuto	Enginneering colloidal quantum dots: synthesis, surface chemistry, and self-assembly / Maryna I. Bodnarchuck and Maksym V. Kovalenko -- Aqueous based colloidal quantum dots for optoelectronics / Vladimir Lesnyak and Nikolai Gaponik -- Electronic structure and optical transitions in colloidal semiconductor nanocrystals / Todd D. Krauss and Jeffrey J. Peterson -- Charge and energy transfer in polymer/nanocrystal blends: physics and devices / Kevin M. Noone and Davis S. Ginger -- Multiple exciton generation in semiconductor quantum dots and electronically coupled quantum dot arrays for application to third-generation photovoltaic solar cells / Matthew C. Beard, Joey M. Luther, and Arthur J. Nozik -- Colloidal quantum dot light emiting devices / Vanessa Wood, Matthew Panzer, Seth-Coe Sullivan, and Vladimir Bulovic -- Colloidal quantum dot photodetectors / Gerasimos Konstantatos -- Optical gain and lasing in colloidal quantum dots / Sjoerd Hoogland -- Heterojunction solar cells based on

colloidal quantum dots / Jeffrey J. Urban and Delia J. Milliron -- Solution-processed infrared quantum dot solar cells / Jiang Tang and Edward H. Sargent -- Semiconductor quantum dot sensitized TiO mesoporous solar cells / Lioz Etgar, Hyo Joong Lee, Sang II Seok, Md. K. Nazeeruddin, and Michael Gratzel.

Sommario/riassunto

Capturing the most up-to-date research in colloidal quantum dot (CQD) devices, this book is written in an accessible style by the world's leading experts. The application of CQDs in solar cells, photodetectors and light-emitting diodes (LEDs) has developed rapidly over recent years, promising to transform the future of clean energy, communications, and displays. This complete guide to the field provides researchers, students and practitioners alike with everything they need to understand these developments and begin contributing to future applications. Introductory chapters summarise the fundamental physics and chemistry, whilst later chapters review the developments that have propelled the field forwards, systematically working through key device advances. The science of CQD films is explained through the latest physical models of semiconductor transport, trapping and recombination, whilst the engineering of organic and inorganic multilayered materials is shown to have enabled major advances in the brightness and efficiency of CQD LEDs.