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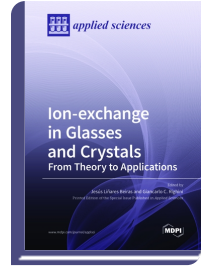
*Special Issue Reprint*

## **Ion-exchange in Glasses and Crystals: from Theory to Applications**

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Since its first observation in 1850, ion-exchange (IEx) has become a fundamental process in many applications involving water treatment, catalysis, chromatography, and the food and pharmaceutical industries. Starting from the early 1900s, another relevant application of IEx has been in the glass industry, with the surface tempering of glass produced by a  $K^+$ - $Na^+$  ion exchange. Nowadays, photonics has greatly exploited IEx technology: graded-index microlenses, graded-index fibers and integrated optical waveguides and devices are examples of achievements made possible by the IEx process. Moreover, ion-exchange is possible in ferroelectric crystals, too, and has been fundamental for the development of many linear and nonlinear integrated optical devices in lithium niobate and tantalate.

This volume collects articles published in the corresponding Special Issue of the *Applied Sciences* journal. Four review articles, written by internationally renowned experts in this field, provide complementary overviews of the history, fundamental aspects, designs and fabrications of devices, and technological achievements. Three articles describe original research in the fields of diffraction grating, photo-thermo-refractive glasses, and Yb-doped lithium niobate. This volume constitutes a valuable and updated reference for all students and researchers wishing to improve their knowledge and/or make use of ion-exchange technology and its applications.



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