



Preface

Water plays a fundamental role in life and, although a tremendous amount of research has been performed on this seemingly simple substance, there are still many unresolved questions. The literature is virtually unlimited and it is impossible to cover more than a few topics in this book. I have chosen to concentrate on snow and ice, and I hope the book will whet the appetite to learn more about this fascinating field. The selected topics are mostly rather briefly treated but further information is easily available on the Internet. It therefore seems unnecessary to include a long list of references here.

Water plays a unique role in chemistry. The special properties of the different forms of water — from ice and snow to liquid water — are due to hydrogen bonding between the H_2O molecules, and this book is a tribute to a field to which I have spent a major part of my research. The hydrogen bond is of fundamental importance in biological systems since all living matter has evolved from and exists in an aqueous environment. Hydrogen bonds are involved in most biological processes as little energy is needed in forming as well as breaking these bonds.

I wish to express my sincere thanks to Prof. Yoshinori Furukawa of the Institute of Low Temperature Science (Hokkaido University), British artist Simon Beck, Canadian photographer Don Komarechka, and Russian photographers Alexey Kljatov and Andrei Osokin for their kind permission to include their beautiful and sometimes unique pictures. I hope the pictures reproduced here will stimulate further studies regarding their books.

I am grateful for permission from publisher De Gruyter to reprint my articles from *Zeitschrift für Physikalische Chemie*, from publisher VCH Verlagsgesellschaft GmbH to reprint a paper from *Angewandte Chemie, International Edition* and from the Harbourcreek Historical Society to reprint an article from their newsletter. My thanks to Prof. Kenneth Libbrecht for permission to use his snow crystal morphology diagram. Many thanks to Prof. Emer. Anders Liljas for checking the manuscript and for his valuable suggestions. I welcome suggestions for improvements and the alerting of errors.

Ivar Olovsson
Uppsala, 15 October 2015
Ivar.Olovsson@gmail.com