PREFACE

Until 1974, only a few halide glass forming systems -- primarily $ZnCl_2$ and those based on BeF_2 -- were known. These were mainly of academic interest. In March 1974 Michel Poulain, then a research technician at the Université de Rennes, produced quite by accident the first known heavy metal fluoride glass while attempting to synthesize a fluorozirconate single crystal. An extensive research effort in these materials was started at the Université de Rennes, partly because of the practical implications of their broad range of I.R. transparency and partly because of their novelty. A large number of published papers on heavy metal fluoride glasses, starting in 1975, resulted from this work. However, it was not until about 1978 that the French work began to be noticed and similar research efforts were commenced in laboratories in England, the United States and Japan. In 1979, it was realized that heavy metal fluoride glasses had real potential as materials for fiber optic waveguides which might exhibit losses orders of magnitude lower than those of silica based fibers.

In 1980 Martin Drexhage and C.T. Moynihan met with Jacques Lucas in the Boston area to discuss mutual research interests. During this meeting, the opinion was jointly ventured that there was now sufficient activity in halide glasses to warrant a small informal conference. At that time, it was thought such a meeting might attract perhaps twenty-five participants. It was nearly two years later, in March 1982, that this event actually occurred, after prevailing upon John Gannon to organize and chair it. The meeting was held at Cambridge University in the U.K., and entitled the "First International Symposium on Halide and Other Non-Oxide Glasses". The major portion of this conference was devoted to halide glasses, and by that time interest in the field had picked up to the point that 39 papers were presented on halide glasses and 96 conferees took part in the meeting.

This first Symposium was so successful that it was immediately decided to hold a second meeting, restricted now to halide glasses only. The "Second International Symposium on Halide Glasses", organized by C.T. Moynihan, took place in August 1983 at Rensselaer Polytechnic Institute in the U.S.A. This time, 60 papers were presented and 135 persons participated.

The "Third International Symposium on Halide Glasses", organized by Jacques Lucas, was held at the Université de Rennes in France in June 1985. The accelerating research activity in this area was evidenced by the fact that 109 papers were presented and some 220 scientists and engineers were in attendance. At this point it was decided that interest in halide glasses was sufficiently widespread that formal publication of the Symposium papers was warranted. These appeared as Volumes 5 and 6 of Materials Science Forum.

The "Fourth International Symposium on Halide Glasses", organized by M. Robinson, was held in Monterey, California in the U.S.A. in January 1987. One hundred sixty-two conferees were in attendance and 88 papers, subsequently published as Volumes 19 and 20 of Materials Science Forum, were presented.

In the present two volumes are collected the papers given at the "Fifth International Symposium on Halide Glasses", organized by M. Yamane and held at the Fuji Institute of Training and Education in Japan, May 29 - June 2, 1988. During this four-day meeting 102 papers were presented and 119 persons participated.

As will be evident to the reader, our knowledge of halide glasses is now well developed, particularly with regard to the fluorozirconate systems. Significant new fundamental results were reported at this meeting in the areas of rare earth-doped lasers, ionic transport, thermodynamics of fluorozirconate melts, structural characterization via spectroscopic, diffraction and molecular dynamics techniques, and light scattering from extrinsic sources.

On the applied side, considerable interest continues to be shown in reducing optical losses of fluorozirconate fibers to the now well established intrinsic minimum value of 0.02 dB/km at 2.5 μm. The record achieved value of 0.7 dB/km total loss at 2.5 μm on a thirty meter fiber reported at the Fourth Symposium has not been bettered. However, scattering losses of 0.025 dB/km at 2.5 μm, very close to the intrinsic scattering loss, were reported at the present meeting for selected 5 cm lengths of fluoride fiber. Moreover, substantial progress was reported in purification of starting materials and low level analytical techniques for light absorbing metallic impurities. Likewise encouraging is enhanced interest and progress in other applications of fluoride glasses, including short length optical fibers for remote sensing and bulk glass and fiber infrared lasers. Production of high quality large bulk glass pieces up to one inch in thickness has been achieved.

The "Sixth International Symposium on Halide Glasses" is tentatively scheduled for early October 1989 in Clausthal, West Germany, and will be organized by Prof. G. Frischat. In the meantime, we hope that these two volumes will give the reader a state-of-the-art picture of halide glass science and engineering.

Organization of this Symposium would not have been possible without the help of many colleagues and coworkers. To them are extended heartfelt thanks. Likewise, with regard to the always important financial side, implementation of the Symposium could not have been accomplished without support from private companies and foundations in Japan. Sincerest thanks to them also.

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