HALIDE GLASSES

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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 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 100 times less than those of silica based fibers.

In 1980, the two editors of these volumes met with Martin Drexhage 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, we thought such a meeting might attract perhaps twenty five participants. It was nearly two years later, in March, 1982 that this meeting actually occurred, ably implemented in a more formal fashion by John Gannon, 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 perked 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 one of us (C. T. Moynihan) took place in August, 1983 at Rennselaer Polytechnic Institute in the U.S.A. This time, 60 papers were presented and 135 persons participated.

In the present two volumes are collected the papers given at the "Third International Symposium on Halide Glasses", organized by the other of us (J. Lucas) at the Université de Rennes in France in June, 1985. The accelerating research activity in this area is evidenced by the fact that 109 papers were presented and some 220 scientists and engineers were in attendance. As will be evident to the reader, the field of halide glasses is beginning to show some maturation and distinct progress has been made in addressing fundamental questions, e.g., with regard to the structure of fluorozirconate glasses and to the intrinsic optical properties of halide glasses in general. On the other hand, many fundamental questions remain unanswered. Much work remains to be done on understanding devitrification in these materials, and to date no complete phase diagrams have been determined for the important fluorozir-

conate systems, nor has a complete viscosity temperature curve been measured for even one heavy metal fluoride glass composition. On the more practical side, high optical quality bulk fluorozirconate glasses with highly reproducible properties can now be prepared routinely, and several laboratories have reported preparation of fluoride glass fibers with minimum losses of a few dB/km in the mid-I.R. At the same time, it has become evident at this Symposium that truly novel and stringent materials preparation and fabrication procedures will be required if fiber optic losses are to be reduced much below this level. We hope that answers to some of these questions and problems will be presented at the "Fourth International Symposium on Halide Glasses", tentatively planned for the end of 1986 or the beginning of 1987. In the meantime, we hope that these two volumes will serve to give the reader a complete 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, many of our colleagues and coworkers. To them, we extend our heartfelt thanks. Likewise, with regard to the always important financial side, implementation of the Symposium could not have been accomplished without support from government agencies and private companies in both France and the United States. Our sincerest thanks to them also.

Jacques LUCAS & Cornelius T. MOYNIHAN
Rennes, France, June, 1985.

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