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Hole Collapse During the Drawing Process for a Hollow Optical Fiber JING YANG, YOGESH JALURIA, Rutgers University — Hollow fibers are of interest in many applications, such as disgnostics, telecommunications and power delivery. The collapse of the hole is of particular interest in the drawing process for these optical fibers because it changes their basic characteristics. An analytical and numerical model is developed for the flow of glass and inert gases under typical drawing conditions. The zonal method is employed to simulate the radiative transport in the material. The transport processes are investigated and changes in the hole diameter are calculated. The ratio of the diameter of the hole at the end of the draw process to that in the starting glass cylinder, or perform, is determined. The results show that the collapse ratio is strongly dependent on surface tension effects. The radius ratio in the preform and the drawing speed are found to be relatively weak effects. A high difference in pressure between the hole and the ambient medium, high feeding speed, low surface tension, and low furnace temperature help in curbing the collapse of the hollow fiber during the drawing process. A comparison between the results for a polymer (PMMA) and a silica fiber shows that polymer fibers have an advantage over silica fibers in the preservation of the shape due to the relatively low surface tension.

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