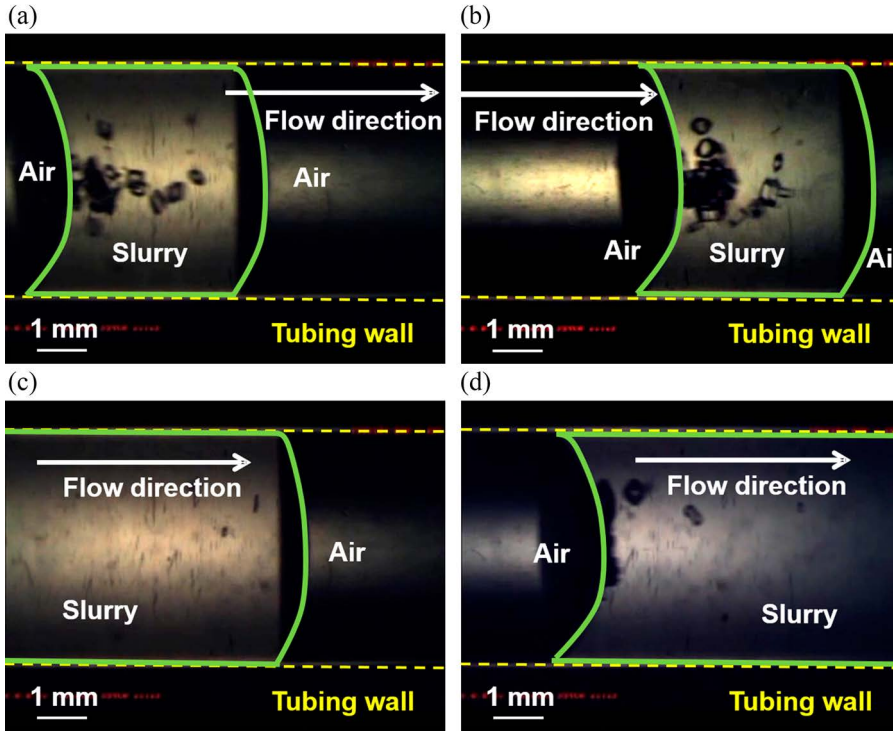

Figure 5.3 In-line stereomicroscope video snapshots of (a) an earlier time and (b) later time of a slurry slug with an aspect ratio of about 1, and (c) the front and (d) the end of another slurry slug with an aspect ratio close to 4. Slurry slugs are separated by air slugs inside a silicone tube (two inner walls, pale lines). The black shades at two air/liquid interfaces are due to curvature. Adapted from ref. 51 with permission from John Wiley and Sons, © 2017 WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim.

5.1.2 Chapter Outline

The structure of this chapter is based on a process intensification and design strategy of an advanced continuous crystallizer, namely, decoupling nucleation and growth for individual control while suppressing undesired phenomena. For example, the suppression of secondary nucleation and aggregation in the growth stage has been demonstrated during slug-flow crystallization, when the equipment and operations are appropriately designed. For the sections in this chapter, experimental discovery is supported by theoretical review/analysis and design/operational advice. The specific sections are

- The slug formation process is detailed in Sections 5.2 and 5.3. Specifically, the stability and sizes of slugs can be tuned to improve the recirculation flow pattern, and the size distribution of product crystals inside.[2] Detailed review and analysis from fluid mechanics and transport phenomena perspectives are also included.