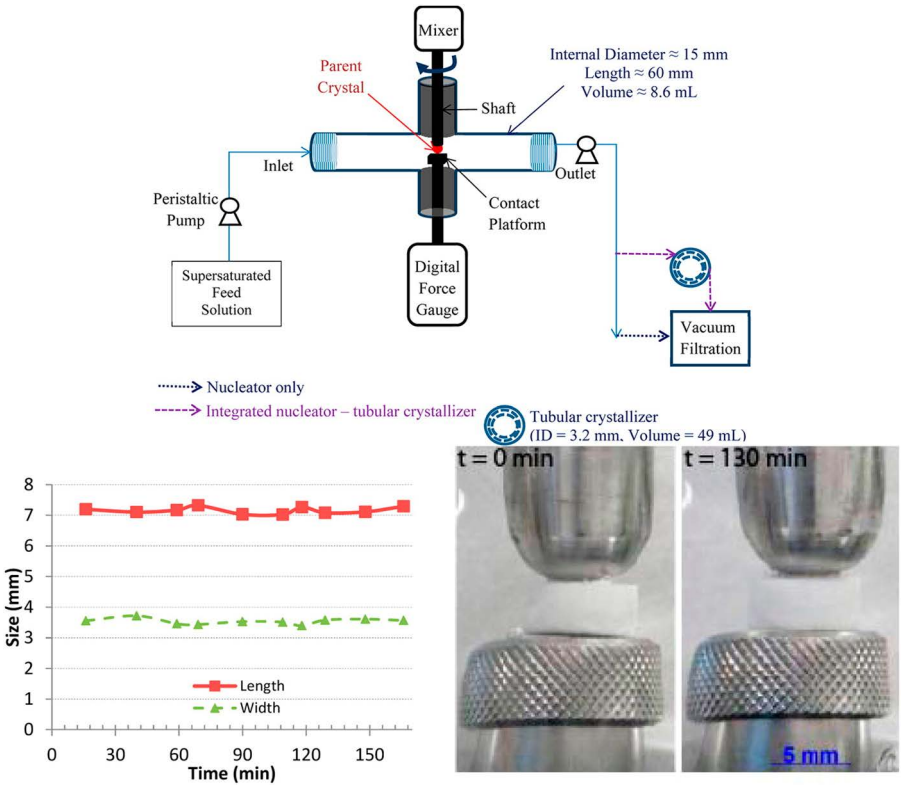

Figure 1.14 Example of continuous contact nucleator. Reproduced from ref. 149 with permission from American Chemical Society, Copyright 2013.

been shown to reduce the time required to reach steady state. As with the standard MSMPR cascade, the upstream wet mill feeding to an MSMPR can be combined with a nucleation control strategy where particle chord count information from the FBRM is used to implement heating or cooling rates to maintain particle chord counts in a desired setpoint range during the crystallization process.[148] This additional control in the MSMPR allows for the PSD to be more finely tuned.

1.4.9 Secondary Nucleators

In addition to devices for inducing primary nucleation there has also been research into devices for inducing secondary nucleation from a parent crystal or tablet. Recent studies have demonstrated devices which use contact secondary nucleation as a means of creating seed crystals for continuous tubular crystallizers.[149,150] Firstly it was demonstrated that secondary nuclei could be continuously generated in such a fashion that the size of the nuclei could be controlled by the supersaturation of the feed solution and the residence time (by changing flow rate),[149] see Figure. 1.14. As this secondary nucleation process is decoupled from the growth stage the PSD of the final