A Very Simple, Pleasant and Trouble-Free Crystal Growth Method: Introduced A Novel ISR Method for Unidirectional Growth

P. Karuppasamy[1]*, T. Kamalesh[1], Muthu Senthil Pandian[1], P. Ramasamy[1], Sunil Verma[2]
*Email: karuppasamyp@ssn.edu.in
1 SSN Research Centre, Sri Sivasubramaniya Nadar College of Engineering, Chennai-603110, Tamil Nadu, India.
2 Laser Materials Development and Devices Division, Raja Ramanna Centre for Advanced Technology (RRCAT), Indore-452013, Madhya Pradesh, India.

The optically good quality organic 2-aminopyridinium 4-nitrophenolate 4-nitrophenol (2AP4N) single crystal was grown by a novel Immersing ampoule Sankaranarayanan–Ramasamy (ISR) method. The solution-contained growth ampoule was covered completely in the unidirectional method for the first time in the literature. The ampoule was created specifically for the purpose of improving quality with bulk size single crystals through slow cooling. The formation of secondary nucleation can be controlled by avoiding temperature gradient developed on the solution surface. This process is very simple and optimization parameters have been made simpler compared to conventional SR method. The optical behavior of the grown crystal was analyzed by a UV-Vis NIR spectrophotometer. The optical homogeneities of the single crystal have been analyzed by birefringence measurement. The crystalline perfection of different growth portions (bottom, middle and top) was analyzed by HRXRD measurement. The various studies reveal that the ISR method of growing single crystals is favorable for high performance laser applications.

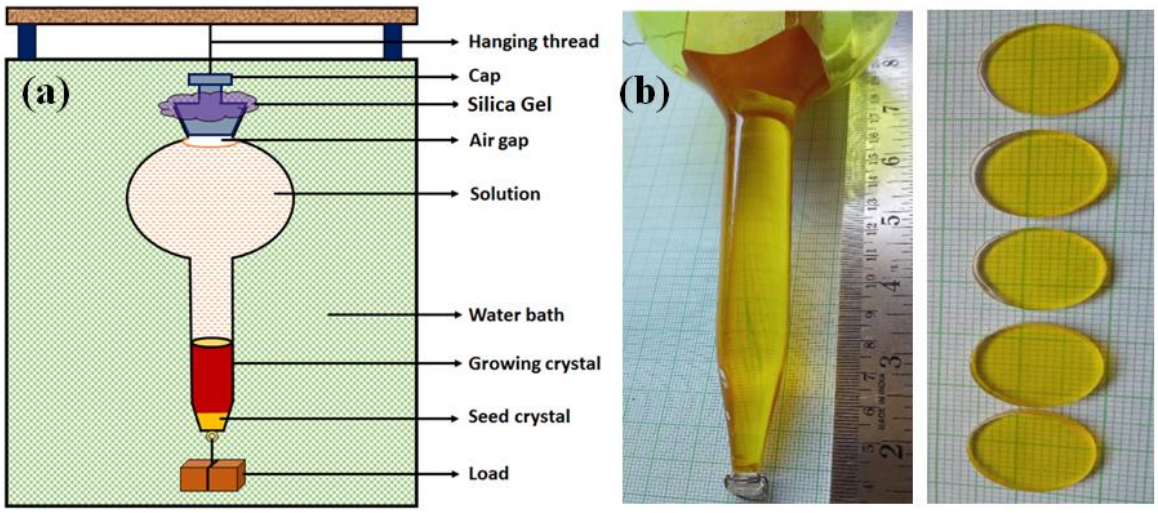

Figure. (a) Schematic diagram of ISR method and (b) Grown single crystal and its wafers

References

[1] P. Karuppasamy, T. Kamalesh, M. Senthil Pandian, P. Ramasamy and S. Verma, J. Cryst. Growth, 577, 126401 (2022).