

Separation Technology Using Supercritical CO₂: Technology Transfer from University to Industry and Spin-off Company

Motonobu Goto,^{a, b, *} Masahiro Tanaka^b

^a *Institute of Materials Innovation, Nagoya University, Nagoya 464-8603, Japan*

^b *Super Critical Technology Centre Co. Ltd., Kuwana, 511-0838 Japan*

**Corresponding author: goto.motonobu@material.nagoya-u.ac.jp*

1. History

We have been working on supercritical fluid research since 1988 at Kumamoto University and Nagoya University. Our main interest was extraction and separation processes including fundamental extraction modelling and development of novel processes. The late Dr. Ryuichi Fukuzato (Kobe Steel, Ltd. and SCF Techno-link, Inc.) and M. Goto had been collaborating on education, fundamental research, process development to promote supercritical fluid technology. We held workshops on supercritical fluid many times for industrial people. We found the industries desire to treat materials using supercritical fluid by using facilities located in Japan. However, those available facilities are quite limited in Japan.

In these situations, we desire to have versatile supercritical fluid facility in Japan. Although I had been collaboration with many companies as university professor, processing sample size is limited physically and legally.

2. Spin-off company

Dr. Fukuzato and Goto launched spin-off company “Super Critical Technology Centre Co. Ltd. (<http://www.sctc.co.jp/en/>)” focusing on supercritical CO₂ extraction in 2013 supported by KEC Group company. It was later certified as a university-launched venture company. Starting from lab-scale extractor, number of equipment increased gradually. Now we have a pilot-scale extraction plant and commercial-scale extraction plant. The business contents of the company are technical consulting, contract-based prototyping, pre-production, and contract-based production.

Production of decaffeinate green coffee beans has started in 2019, since there was no decaffeination process in Japan. The decaffeination process was extended to green tea and black tea.



(a)

(b)

(c)

(d)

Figure 1 (a) Lab-scale extractor, (b) Counter-current extractor, (c) Pilot-scale extractor, and (d) Commercial-scale extractor