§7. Molten Salt Experimental Loop and Thermohydraulics for Flibe

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A molten salt experimental loop was constructed at Tohoku University supported by NIFS. Figure 1 shows a schematic view and photo of the loop . The characteristic parameters are listed in Table 1. The loop is composed from damp tank, mechanical pump, test section(now it is straight pipe tentatively), upper tank, material test section, air cooler and pipings. The system is heated by 9 sheath heaters. Preliminary heating up test up to 775 K has already been performed without the molten salt, whose results show 753 - 873 K in 27 temperature measuring points.

Numerical analyses for Flibe flow in porous media was carried out to evaluate performance of the porous media for heat transfer enhancement. Numerical results indicate that the distribution of temperature field in the Flibe caused by surface heat flux becomes almost uniform with small pressure drop as shown in figure 2, which means that there is some applicability of Flibe usage not only for blanket breeding material and coolant but also for divertor coolant.

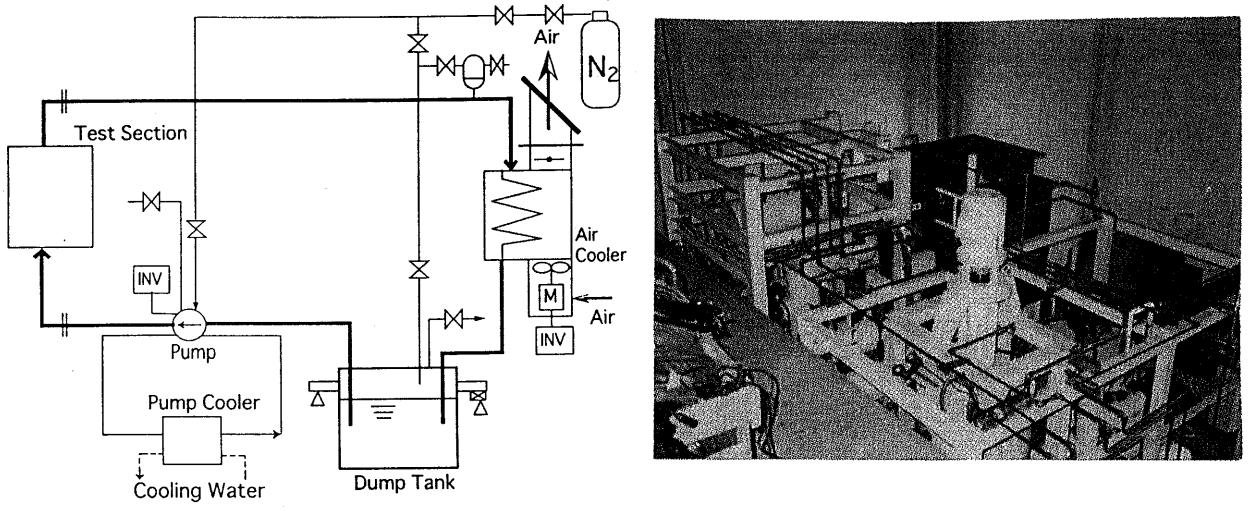

Figure 1 Molten salt loop at Tohoku University

Table 1 Characteristic parameters

Size	: 3m x 3m x 2.6m(H)
Loop type	: closed loop with forced air cooling
Test section	: removable, 70 cm length
Flow rate	: 10 l /min
Operating temperature range	: 773K - 873 K
Heat transfer capacity	: 80 kW
Maximum pressure	: 0.7 MPa
Allowable pressure drop at test section	: 0.4MPa
Structural Material: SUS316	

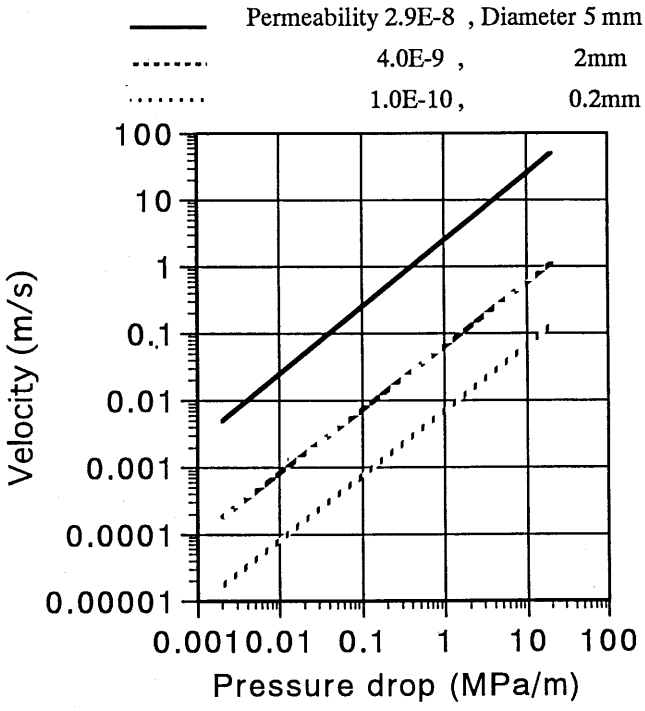

Figure 2 Pressure drop in porous media