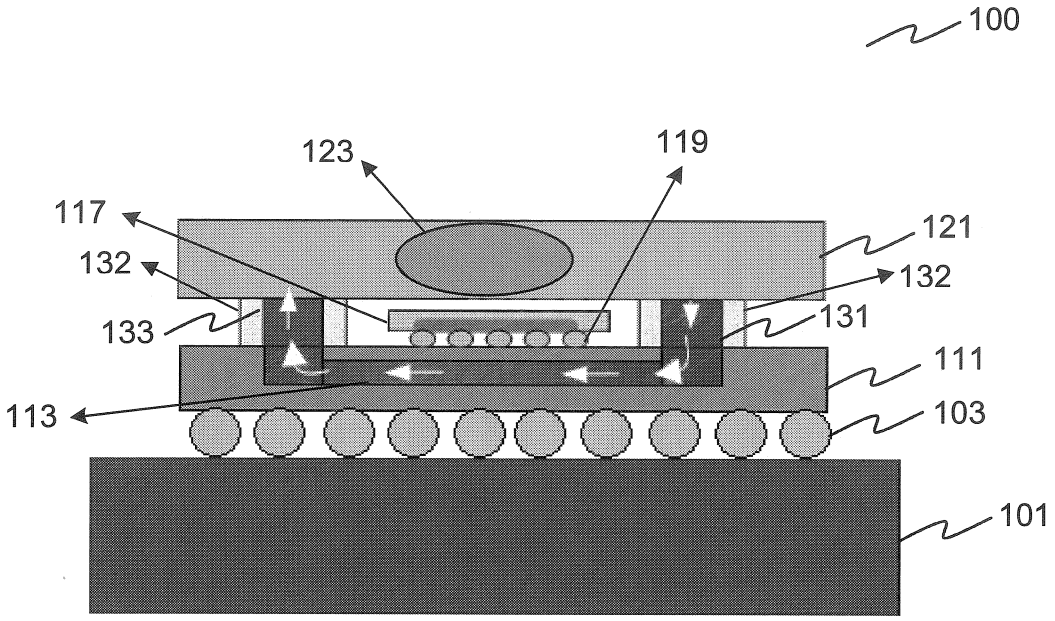


Fig. 1

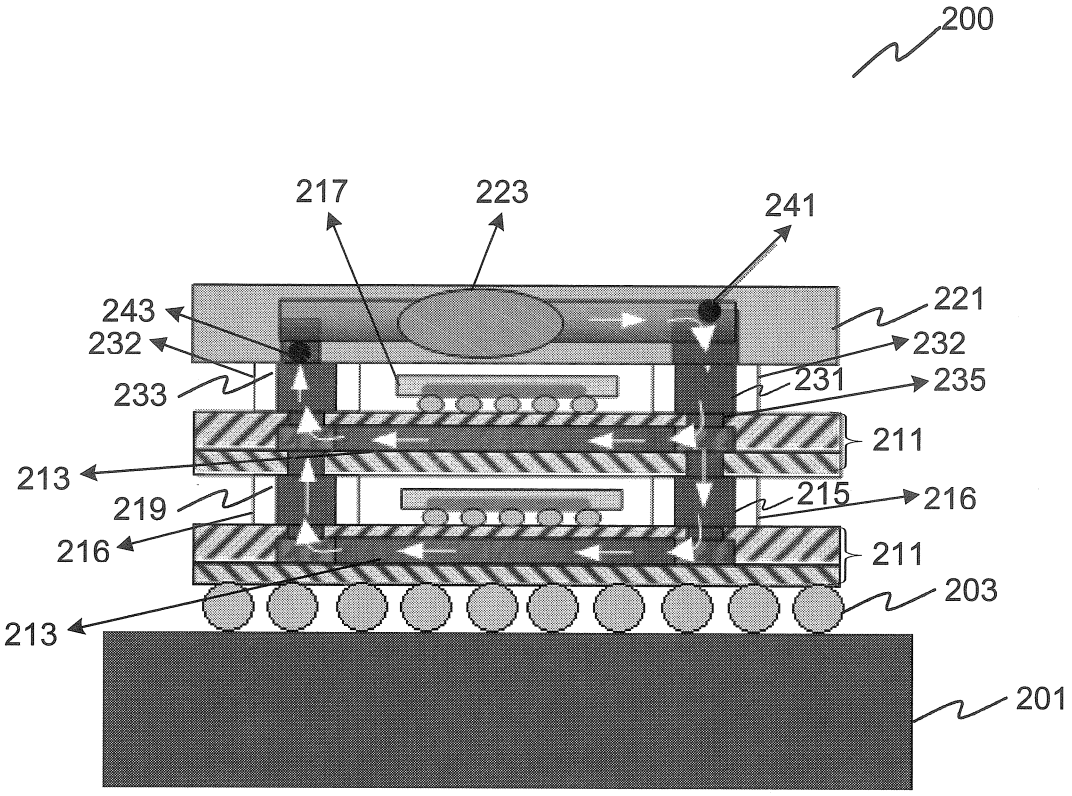

200
217
223
241
243
232
233
221
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211
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215
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216
211
213
203
201

Fig. 2

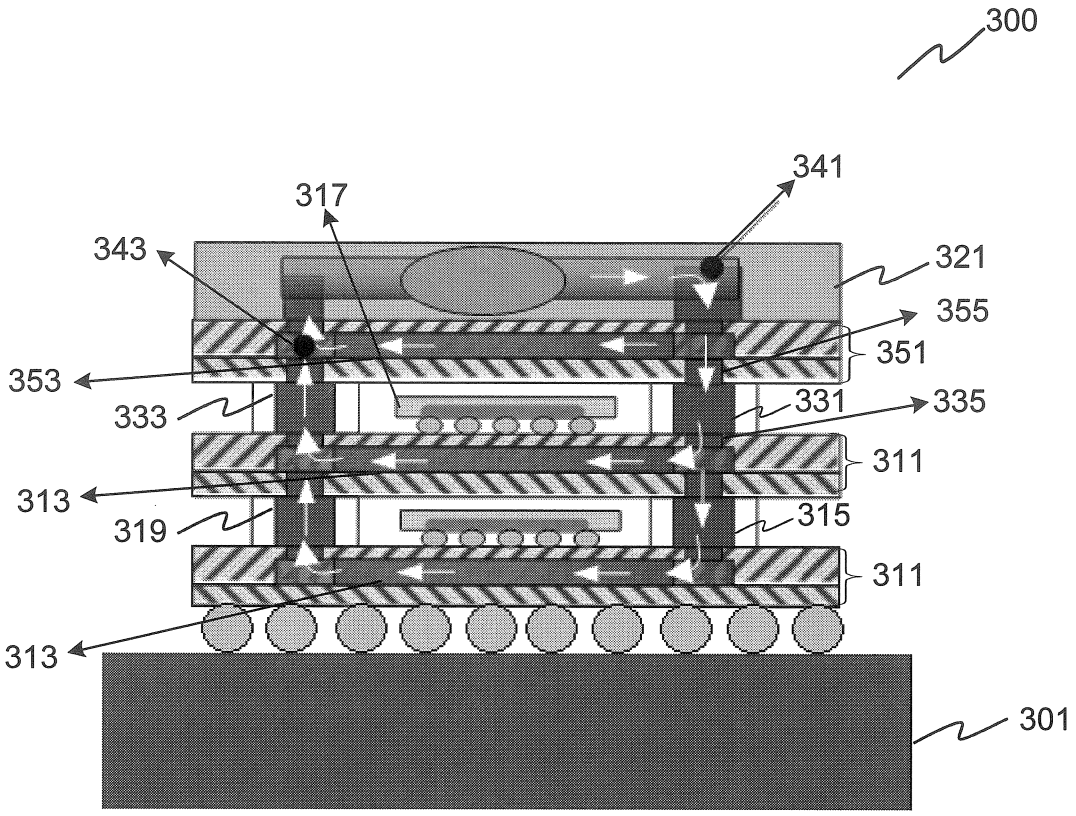

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321
355
351
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331
335
311
313
319
315
311
313
301

Fig. 3

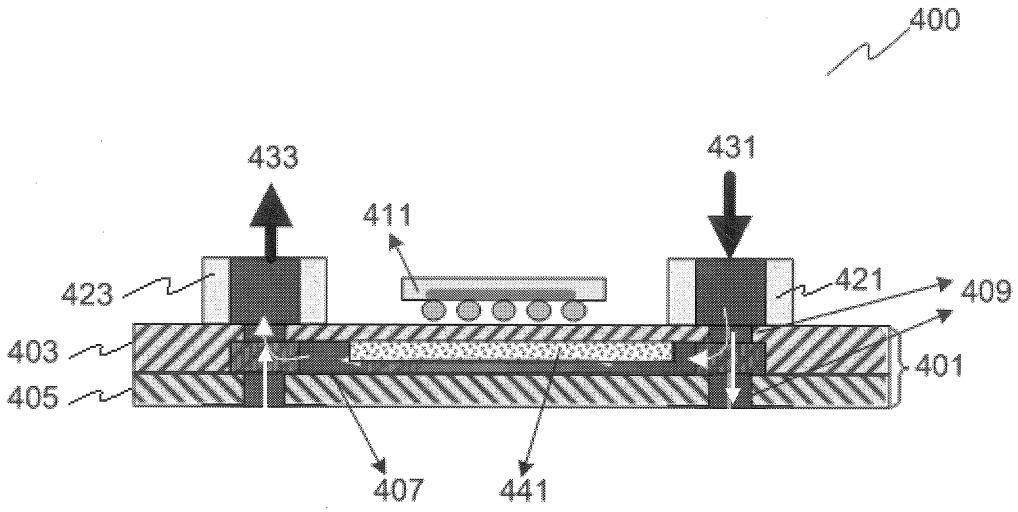


Fig. 4

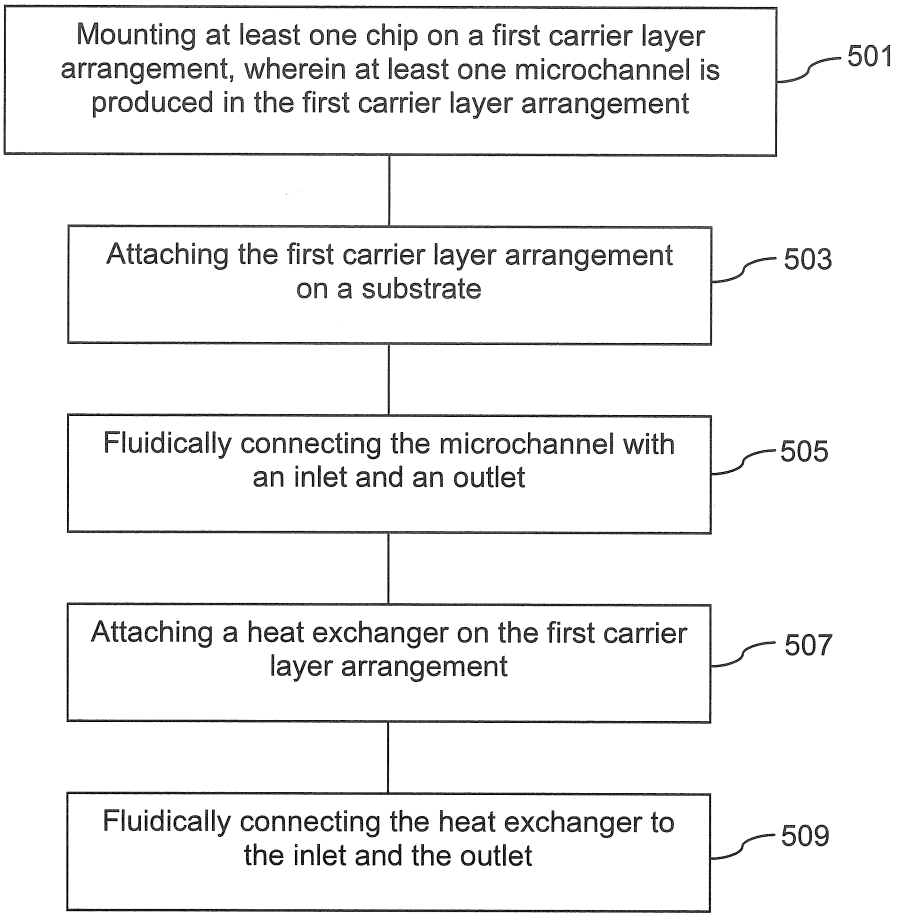

Mounting at least one chip on a first carrier layer arrangement, wherein at least one microchannel is produced in the first carrier layer arrangement
501
Attaching the first carrier layer arrangement on a substrate
503
Fluidically connecting the microchannel with an inlet and an outlet
505
Attaching a heat exchanger on the first carrier layer arrangement
507
Fluidically connecting the heat exchanger to the inlet and the outlet
509

Fig. 5

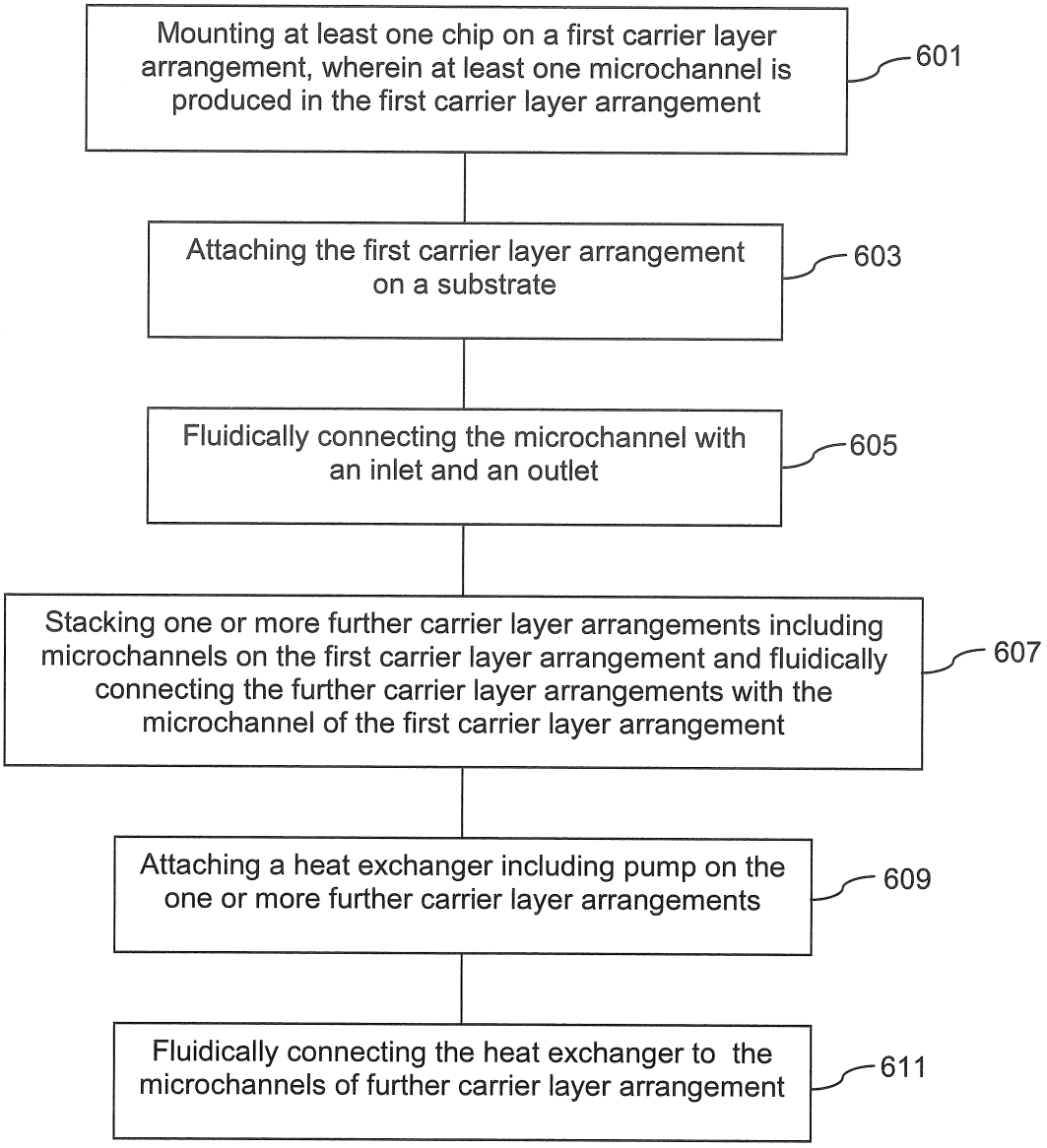

Mounting at least one chip on a first carrier layer arrangement, wherein at least one microchannel is produced in the first carrier layer arrangement
601
Attaching the first carrier layer arrangement on a substrate
603
Fluidically connecting the microchannel with an inlet and an outlet
605
Stacking one or more further carrier layer arrangements including microchannels on the first carrier layer arrangement and fluidically connecting the further carrier layer arrangements with the microchannel of the first carrier layer arrangement
607
Attaching a heat exchanger including pump on the one or more further carrier layer arrangements
609
Fluidically connecting the heat exchanger to the microchannels of further carrier layer arrangement
611

Fig. 6

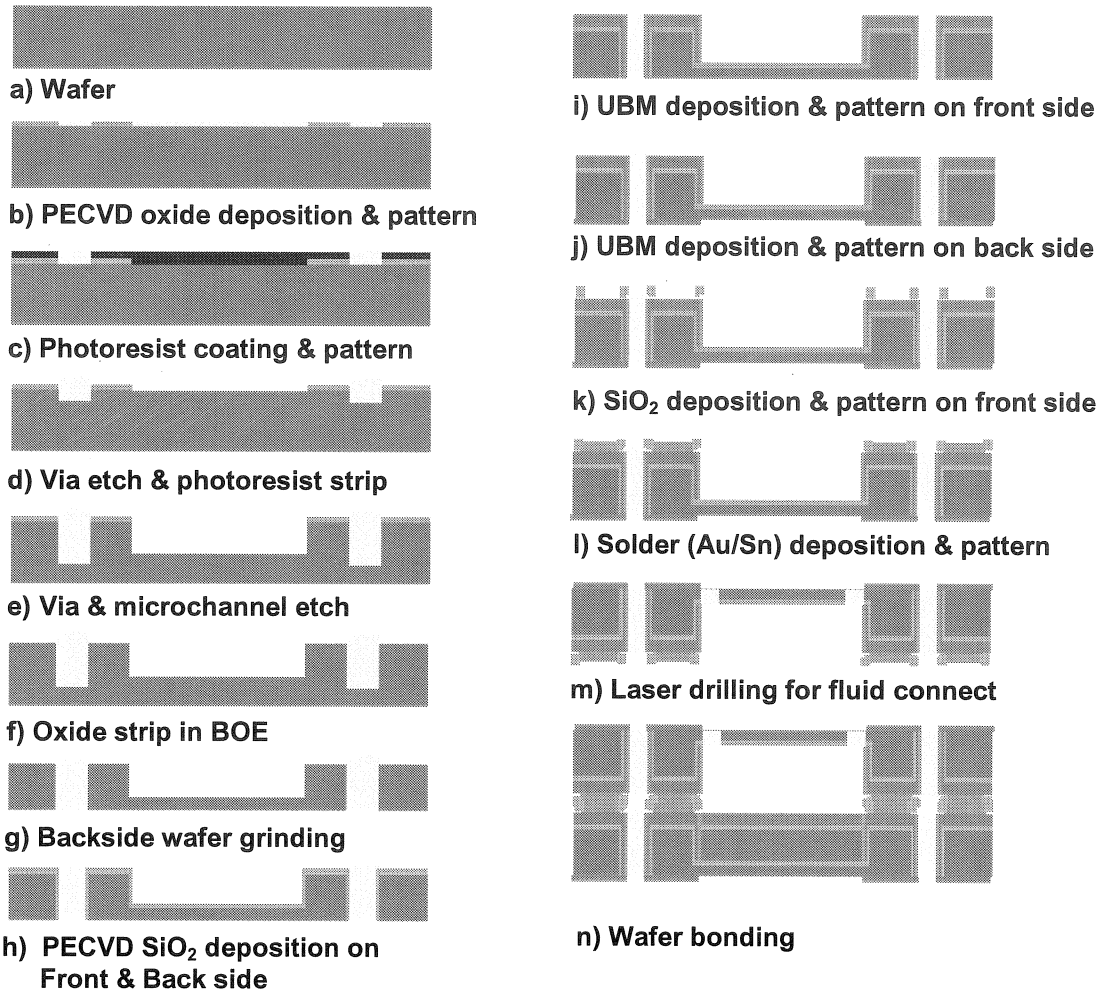

a) Wafer
b) PECVD oxide deposition & pattern
c) Photoresist coating & pattern
d) Via etch & photoresist strip
e) Via & microchannel etch
f) Oxide strip in BOE
g) Backside wafer grinding
h) PECVD SiO_2 deposition on Front & Back side
i) UBM deposition & pattern on front side
j) UBM deposition & pattern on back side
k) SiO_2 deposition & pattern on front side
l) Solder (Au/Sn) deposition & pattern
m) Laser drilling for fluid connect
n) Wafer bonding

Fig. 7

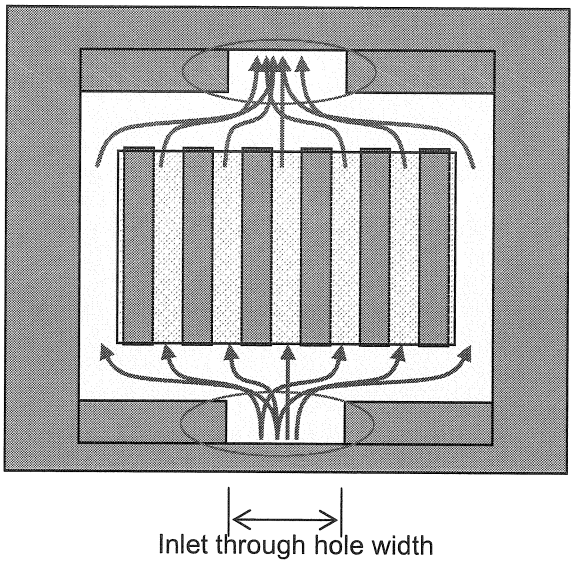


Fig. 8

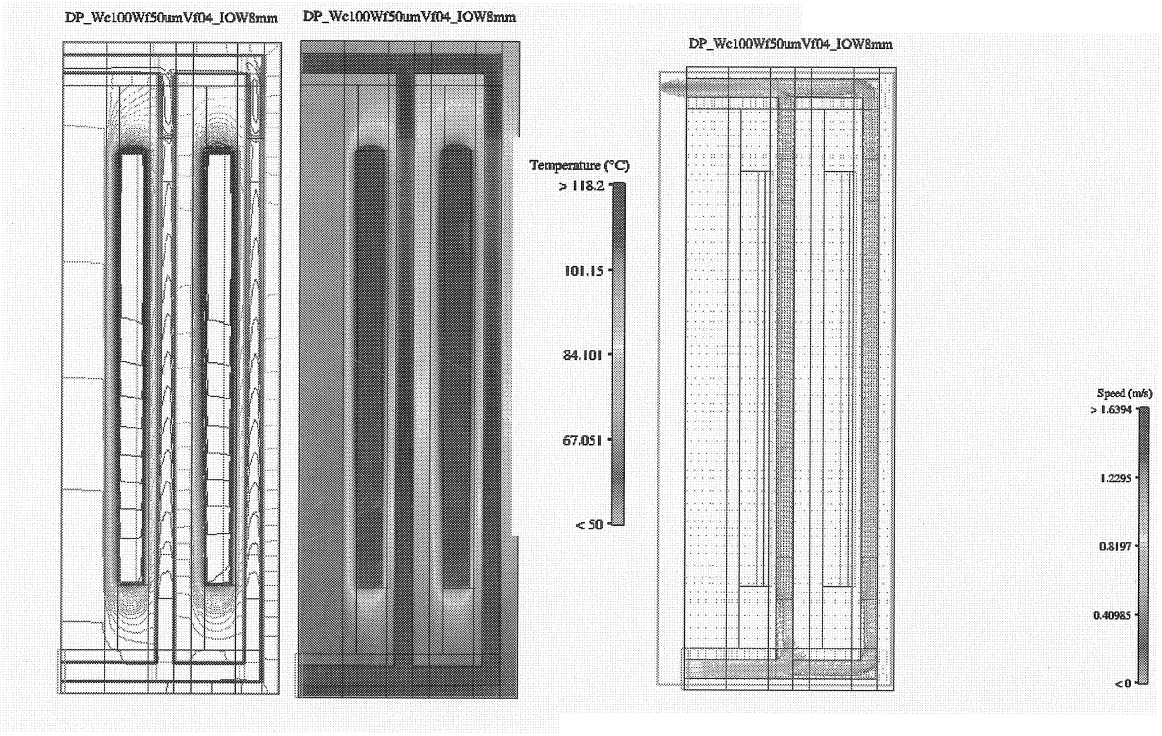

DP_Wc100Wf50umVf04_IOW8mm
DP_Wc100Wf50umVf04_IOW8mm
DP_Wc100Wf50umVf04_IOW8mm
Temperature (°C)
> 118.2
101.15
84.101
67.051
< 50
Speed (m/s)
> 1.6394
1.2295
0.8197
0.40985
< 0

Fig. 9

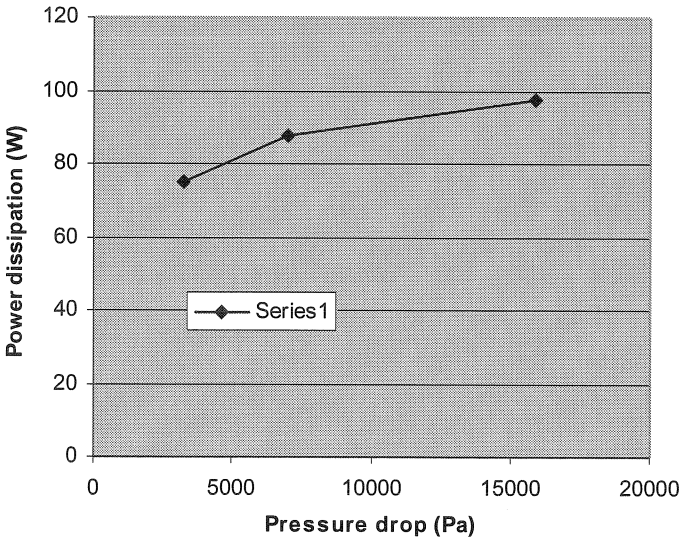

120
100
80
60
40
20
0
Power dissipation (W)
0
5000
10000
15000
20000
Pressure drop (Pa)
Series1

Fig. 10