

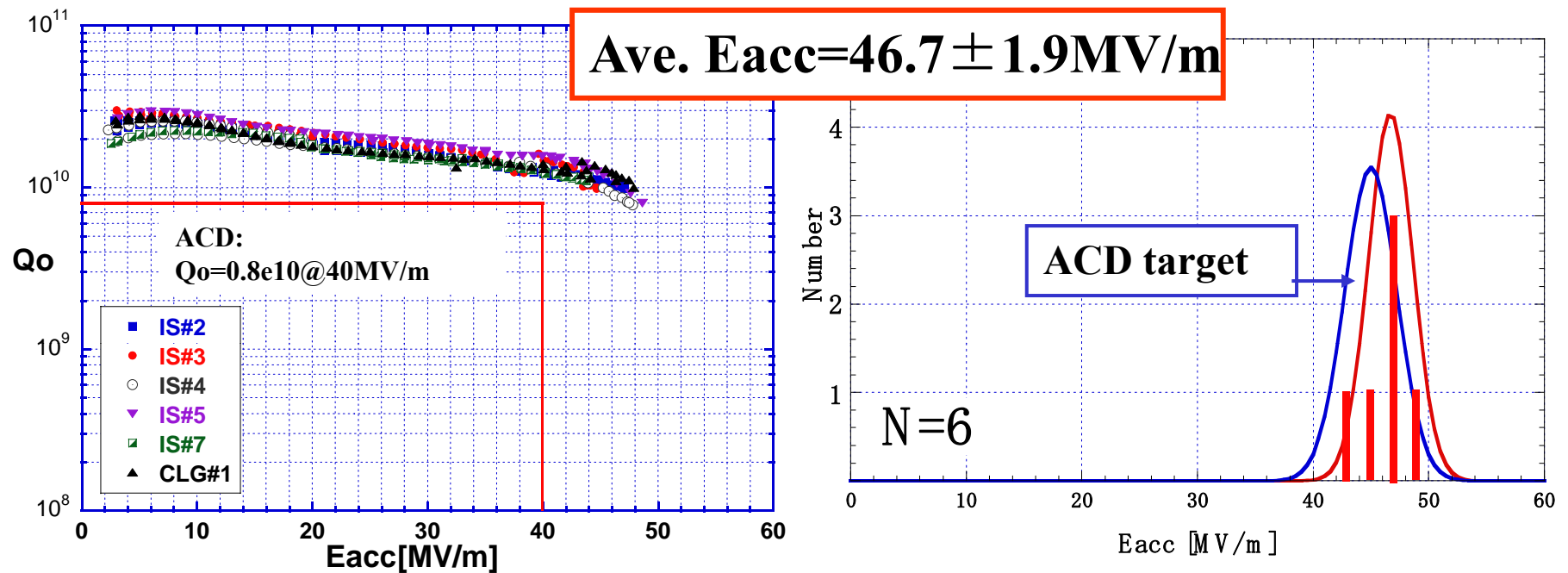
Current study status of high gradient at KEK

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KEK

SCRF meeting Fermilab. Apr. 21-25 2008

Single cell cavity status (ICHIRO center cell shape)



**Recipe : CBP(100 μ m)+CP(10 μ m)+EP(80 μ m)
+EP(20 μ m)+flash EP(3 μ m) +HPR+Baking**

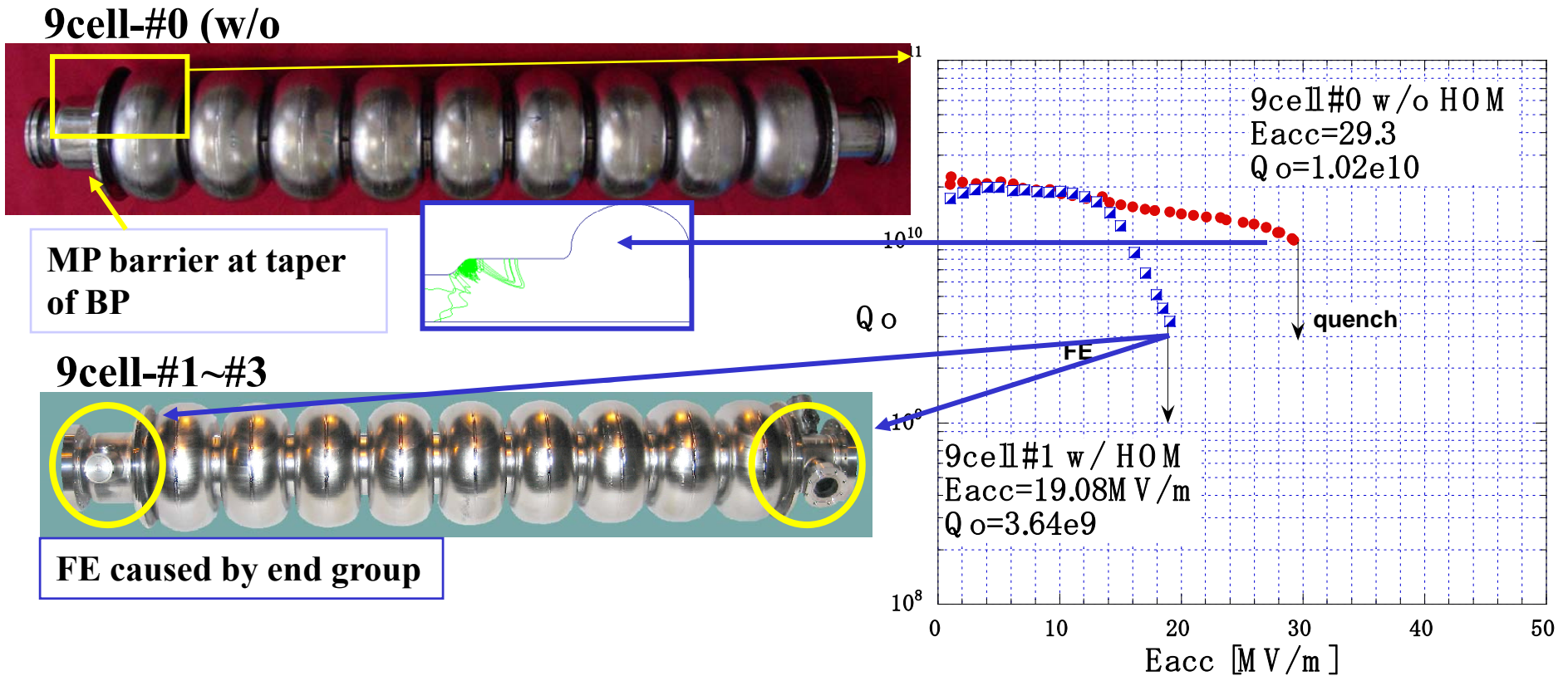
Narrow scattering, high performance.

MP process needed. How to eliminate MP?



Strengthen rinsing after EP.

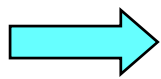
ICHIRO 9-cell cavity status



Key points

Large beam tube, complicated structure of end group

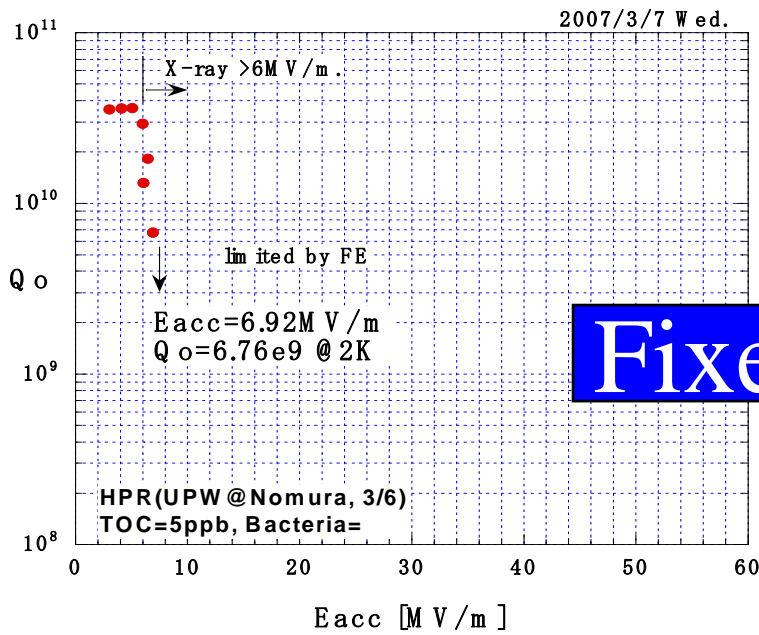
Contamination from HPR pump by long operation.



Re-design of ICHIRO and end-single cell study

Replacement of HPR pump: plunger->diaphragm

Field Emission by Plunger HPR Pump contamination



Fixed!

Final filter -before use-

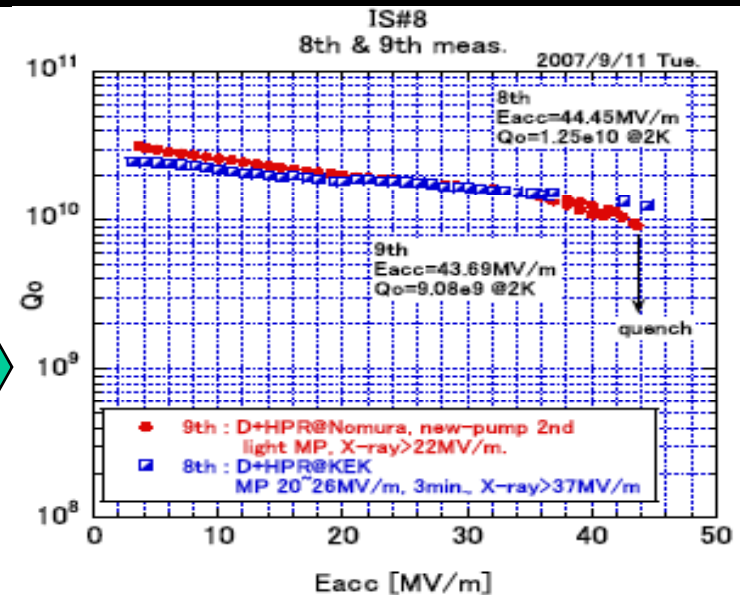
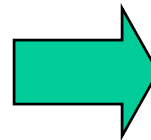


Contaminated



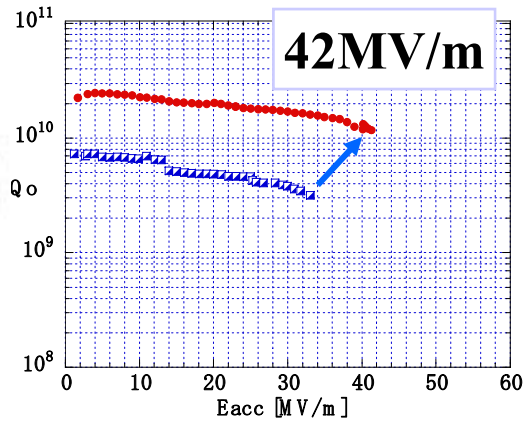
Silicon grease used at plunger sealing of HPR pump!

**HPR pump was replaced to diaphragm type on beginning of Sep. 2007
 Successfully Qualified by single cell cavity tests!**



End-single cell cavities

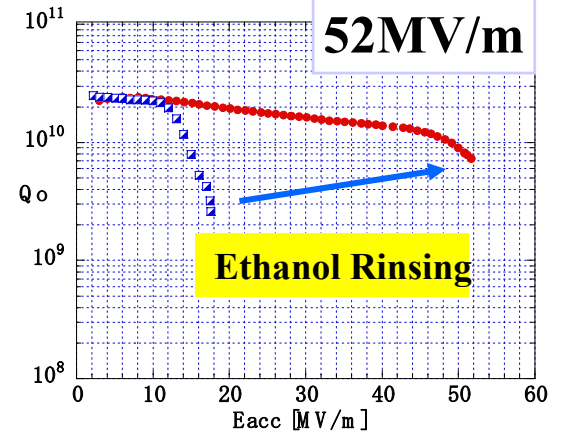
ISE#2
(old)



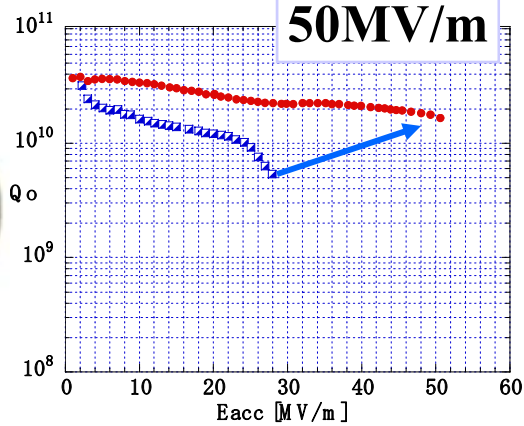
ISE#4
(new)



Just HOM
cylinder



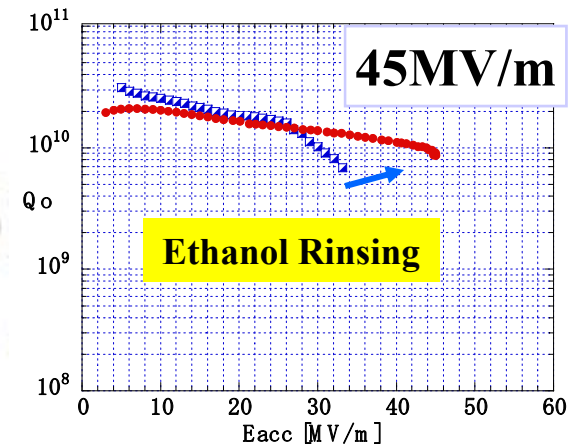
ISE#3
(new)



ISE#5
(old end
group)



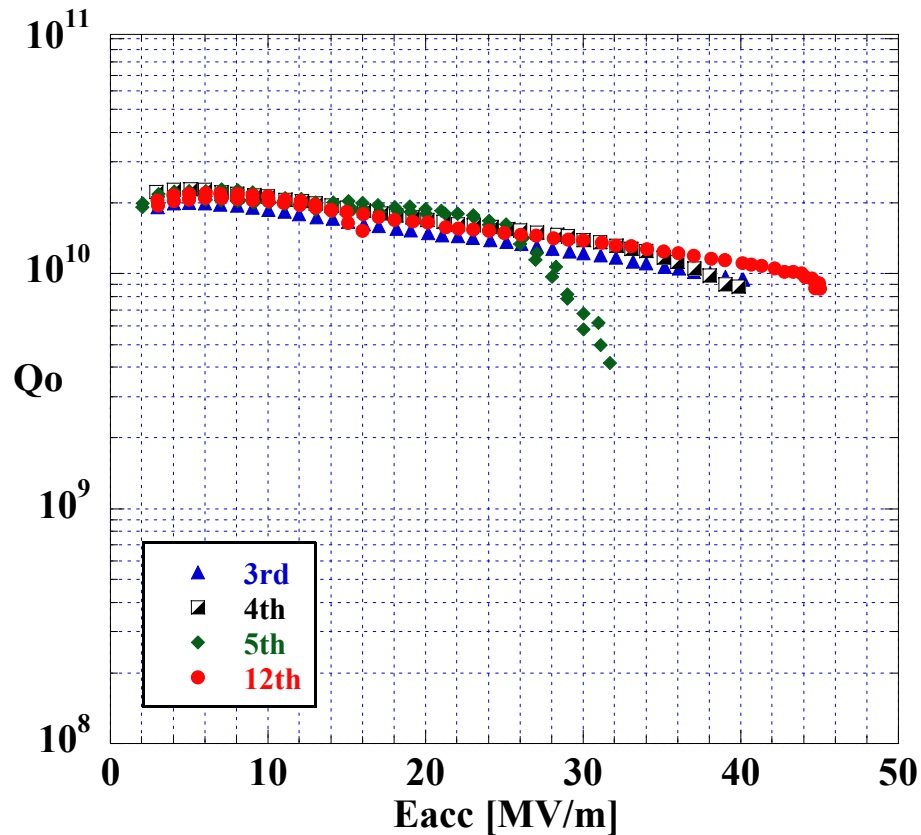
Full HOM



End-cell shape has no problem.

Ethanol rinse has big effects on end groups.

ISE#5 tight loop test



	Eacc[MV/m]	Qo
3 rd	40.2	9.43e9
4 th	39.9	8.83e9
5 th	31.1	4.98e9
12 th	45.1	8.63e9

**EP(20 μ m)+flash EP(3 μ m) +Ethanol rinsing (10min., r.t.)
 +Degreasing(MICRO-90, 2%, 1hr, 50C) +HPR(Nomura, UPW)
 +Baking(120C*48hrs)**

➡ Repeat

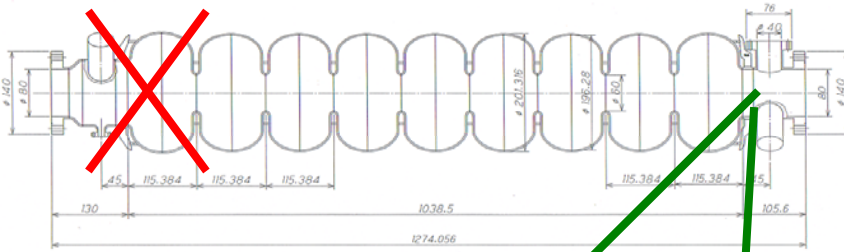
Redesigned 9-cell cavity : New Ichiro 9-cell

9-cell =
= 50MV/

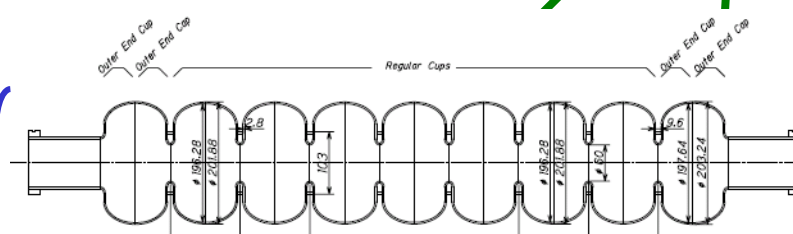


+

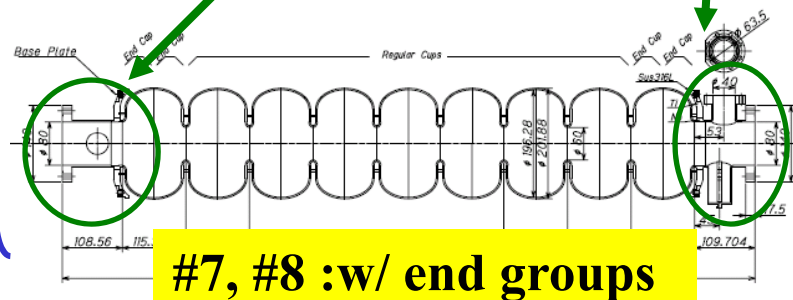
Old



New

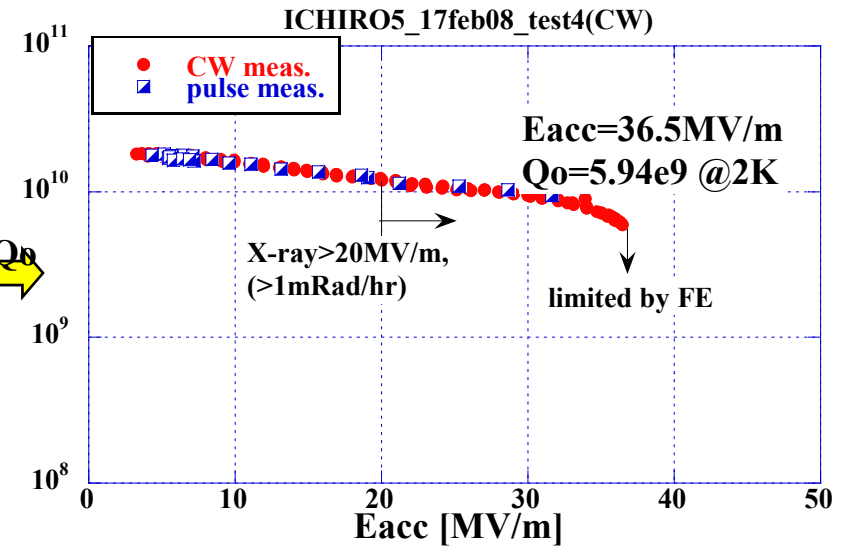


#5, #6 :w/o end groups



#7, #8 :w/ end groups

I9#5 → sent to J-lab
(EP+VT)*3.



Ready to EP, VT

Studies for strengthen rinsing by single cell cavities

(A) +EP(20 μ m) + **flash EP(3 μ m)** + HPR $46.7 \pm 1.9MV/m$ (N=6)
→ High reliability, but still MP process needed.

(B) +EP(20 μ m) + **Degreasing** + HPR $44.2 \pm 6.4MV/m$ (N=5)
→ Well work for reduction of MP.

(C) +EP(20 μ m) + **flash EP(3 μ m)** + **Degreasing** + **Ethanol rinsing** + HPR
→ Well work for end group rinsing.
Need more statistics.

(D) +EP(20 μ m) + **Ethanol rinsing** + HPR
→ *will be tested*

Summary

- **Surface treatment recipe for single cell (center cell shape) was almost fixed. Degreasing has effect on reduction of MP.**
- **Limitations of ICHIRO 9-cell (#0,1,2 and 3) cavities were related to end group and contamination from plunger HPR pump.**
- **Plunger pump was replaced to diaphragm pump, it works well.**
- **End-cell shape single cell cavities were fabricated and tested to understand the end groups.**
- **Ethanol rinsing have effect on end group rinsing. End cell cavity with full end group reached 45MV/m. For the end single cell cavities, more statistics will be collected.**
- **4 re-designed ICHIRO 9-cell (#5, 6, 7, and 8) were fabricated.**
#5 and #6 have simple beam tube, #5 was tested and reached 36MV/m at J-lab.
#7 and #8 have full end group, will be tested next month at KEK.