B. Material Removal Rate

The material removal rate of CoCrMo was practically increased on ECP and UECP processes. As shown in figure 6(a) and 5(b), the UECP process recorded higher MRR even at the lowest current setting (0.12A), unlike ECP process which could be justified as exceptionally lower. Before 0.39A current setting, the MRR of UECP also increased linearly. Towards the highest current setting (0.69A), the increment was somewhat modest.

On the other hand, the MRR of ECP process increased linearly towards the highest current setting (0.69A) although the rate is much less as compared to the UECP process. Figure 8 further emphasizes the huge difference in material removal rate between ECP and UECP. At different current level, UECP recorded almost two times better material removal rate and therefore highlighted the advantage of applying ultrasonic vibration on performing electro-chemical polishing.

As explained by Faraday's Law of Electrolysis, the material removal rate from both ECP and UECP processes are significantly regulated by current and time. As depicted by Figure 8, the material removal rate of both processes recorded an increasing pattern concerning time. The evidence suggested that ultrasonic assisted electro-chemical polishing could generate more than twice material removal rate capability as compared to normal electrochemical polishing process.

IV. Conclusions

This research intended to investigate the effect of ECP and UECP with process parameters; current (A) and time (min) on the MRR and surface roughness of CoCrMo samples. Higher MRR and noticeably lower surface roughness reduction could be achieved by using the UECP process compared to ECP. Highest MRR and surface roughness (Ra) recorded was 0.047 g/min and 2.139 µm respectively at parameter setting of current (0.69A) and time (10min)

Nomenclature

MRR	material removal rate	10^{-3}g/min
Ra	length co-ordinate	µm

Subscripts

W_{loss}	Total material lost
n	Valence of metal ion
F	Faraday's constant
M	Molecular weight of the anode
I	Process currently
T	Processing time
X_b	Initial sample's weight
X_a	Post sample's weight
t	Machining time

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