

















Fig. 5. Simulated EQE curves at  $\lambda = 380$  nm as a function of incident power density for the MQW solar cells with 15% and 25% indium.

#### 4. Conclusion

The dipping behavior of EQE exhibited by InGaN-based MQW solar cells is observed and theoretically analyzed. It is found the dip effect is apparent with the MQW containing 15% indium, and become less obvious when the indium percentage goes up to 25%. The result is attributed to two competing terms in the rate equation describing carrier dynamics in the MQW, i.e. radiative recombination and photocurrent excitation. The investigation presented here is an important step toward unfolding the photovoltaic behaviors of MQW structures.

#### Acknowledgments

The research was supported in part by National Science Council (102-2221-E-008-074, 102-2628-M-002-006-MY3 and 101-2221-E-002-115-MY2), National Taiwan University (103R7823), the Aim for the Top University Project of National Central University (103G903-2), and Energy Technology Program for Academia, Bureau of Energy, Ministry of Economic Affairs (102-E0606).