of ACU, which implies that the large phosphor particle deteriorates the ACU of pc-LEDs. The comparisons of ACU for particle sizes of 30 μm and 100 μm with changing phosphor concentration are plotted in Fig. 2(b). It is seen that when the phosphor concentration changes from 10 to 50%, the ACU for particle of 30 μm increases from 0.85 to 0.91 by 7.1%; while the ACU for particle of 100 μm increases from 0.83 to 0.86 by 3.6%. The increase of phosphor concentration could enhance the ACU, and seems to make bigger difference on smaller particles. For large particles, the effect of phosphor concentration on ACU is weakened, and the causes may be attributed to the strong anisotropy of light scattering intensity of large particle size.

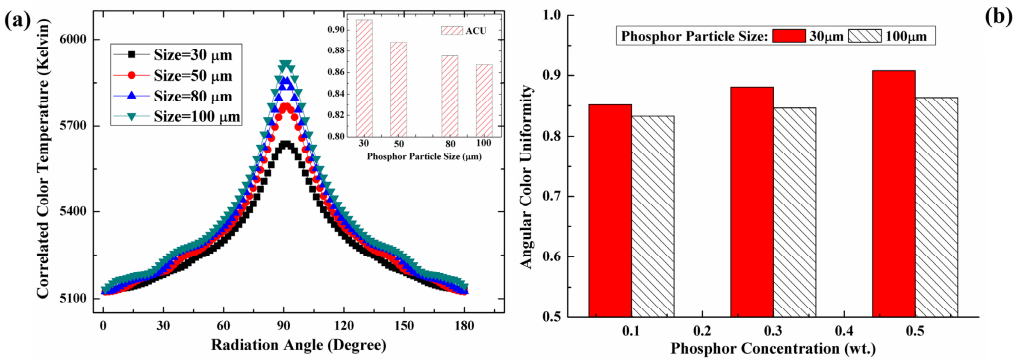

Fig. 2. (a) Variations of CCT and ACU with changing the phosphor particle size. (b) ACU variation with changing phosphor concentration for phosphor particle sizes of 30 μm and 100 μm.

In conclusion, although the large micro-size phosphors can enhance the LE and PE to some extent as presented in ref [1], they will deteriorate the ACU. And the enhancement of ACU by increasing the phosphor concentration is limited for large particles. Therefore, it should be deliberative when applying the large micro-size phosphors. For those applications where the ACU is not so important, the large micro-size phosphors can be used according to ref [1]; for those applications where the ACU is an important property, the large micro-size phosphors may not be used.

Acknowledgments

The authors would like to acknowledge the financial support in part from 973 Project of The Ministry of Science and Technology of China (2011CB013105), and in part by National 863 project of The Ministry of Science and Technology of China (2011AA03A109).

#174582 - $15.00 USD Received 17 Aug 2012; revised 16 Oct 2012; accepted 16 Nov 2012; published 21 Feb 2013