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## 疏浚土免烧法制备粗骨料及其性能研究

李 娜, 贾冬霜, 彭瑜洲, 刘 婷, 吴 燕

(天津科技大学 化工与材料学院, 天津 300457)

**摘要:**以太湖疏浚土为原料,采用免烧法工艺制备小粒径( $<12$  mm)免烧裹壳骨料(WSLAs)。在 WSLAs 的基础上,通过黏结、裹壳工艺制备免烧粗骨料(UCLAs)。以 20~25 mm UCLAs 为研究对象,探究了 WSLAs 级配对 UCLAs 密度、粒径分布、颗粒强度的影响。依据 GB/T 14685-2011 对 UCLAs 的堆积密度、吸水率、筒压强度、压碎值、抗冻性、耐盐性等性能进行测试,并与天然粗骨料(NCAs)做性能对比。结果表明,WSLAs 的最优级配为:1~3 mm 10%、3~5 mm 25%、5~8 mm 50%、8~12 mm 15%。在该 WSLAs 级配下制备高性能 UCLAs 的密度、颗粒强度分别为 1.644 g/cm<sup>3</sup>、2.75 MPa。同时,UCLAs 内部结构稳定、壳层结构密实,使得其吸水率仅为 1.89%,从而表现出与 NCAs 相当的耐久性能,二者经 25 次抗冻融循环、25 d 盐溶液侵蚀均无质量损失。UCLAs 的压碎值为 18.6%,与 NCAs 的压碎值 9.5%相比较,但符合 GB/T 14685-2011 对 II 类粗骨料的要求,可应用于建筑混凝土中起骨架支撑作用。

**关键词:**疏浚土;免烧裹壳骨料;免烧粗骨料;级配;性能

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### Properties of coarse and lightweight aggregates from unburned dredged soil

LI Na, JIA Dongshuang, PENG Yuzhou, LIU Ting, WU Yan

(College of Chemical Engineering and Materials Science, Tianjin University of Science & Technology, Tianjing 300457, China)

**Abstract:** Taihu lake dredged sediment was selected as raw material to produce small-size ( $<12$  mm) wrap-shell lightweight aggregates (WSLAs) from unburned process. The unburned coarse and lightweight aggregates (UCLAs) was obtained by bonding and shell wrapping process from WSLAs. The effects of WSLAs gradation on UCLAs density, particle size distribution and particle strength were then investigated with 20~25 mm UCLAs in this study. The characteristics, such as size distribution, packing density, water adsorption, cylinder compressive strength, crushing value and freezing-thawing resistance of UCLAs, were examined and compared with natural coarse aggregates (NCAs) in accordance with the Chinese National Standards (GB/T 14685-2011). The results showed that the best performance UCLAs were WSLAs 1~3 mm accounting for 10%, 3~5 mm for 25%, 5~8 mm for 50%, and 8~12 mm for 15%. The density and particle strength of this best performance UCLAs obtained from this WSLAs combination were 1.644 g/cm<sup>3</sup> and 2.75 MPa, respectively. At the same time, the internal structure of UCLAs was stable and the shell structure was dense. The water absorption rate was only 1.89%, which showed a durability being comparable to that of NCAs. There was not mass loss in 25 days of salt solution erosion and 25 cycles of freeze-thaw resistance. The crushing value of UCLAs was 18.6%, which was higher than that of NCAs (9.5%), but meets the requirement of GB/T 14685

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作者简介:李娜(1992-),女,宁夏银川人,主要从事污染底泥资源化利用方面研究。E-mail:1099114706@qq.com

通讯作者:吴燕(1976-),女,湖南岳阳人,教授,博士生导师,主要从事污染控制化学方面研究。E-mail:wuyan@tust.edu.cn